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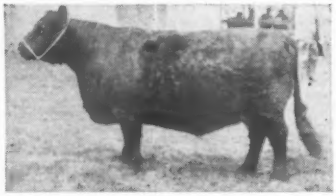

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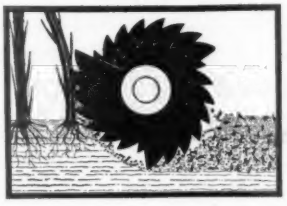

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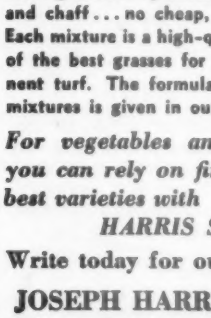

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VOL. 16, NO. 2 FEBRUARY 1950

IN THIS ISSUE

Forum 3

Editorial—Cancer—Part X—Salt ..... J. I. RODALE 14

Organic Soils Behave Differently ..... DR. E. E. PFEIFFER 20

An Oscar for Phlox ..... W. MARVIN LUNDY 22

MILLET as a Human Food ..... W. R. RAYMOND, PH.D. 23

I Don't Believe That Cauliflowers are Difficult to Grow ..... LEONARD WICKENDEN 25

Home Greenhouses are Inexpensive ..... ERNEST CHABOT 26

February Flower Arrangement ..... EVERETT W. FEUCHT 28

The New Organic Method—Some Interesting Facts ..... J. I. RODALE 29

Root Systems of Vegetables—Swiss Chard ..... DR. PAUL SCOTT 32

Miscellany ..... J. I. RODALE 33

Report on Potatoes ..... ALDEN STAHR 35

Spring Problem—Picking the Winners ..... LEONARD WICKENDEN 36

Florida's Stricken Waters ..... BILL WEEKS and HOWARD R. BISSLAND 38

Garden Calendar for February ..... WILLIAM H. EYSTER, PH.D. 44

Men of Organic Farming—Guy Chapman ..... T. W. N. ASHBY 46

Hints for the Flower Garden 52

Hints for the Vegetable Garden 52

Reader's Correspondence 60

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THE FORUM

TOADS, BEES, FRIENDSHIP AS ESSENTIALS TO GARDENING

Last year my garden was almost totally free from the usual bugs and worms that troubled me in the days of chemical fertilizers, but the cutworms did more damage than ever before. The reason: my neighbor's poison sprays and dusts had killed off all the TOADS in the neighborhood, and the toad is about the only Night Worker we have. Of course, the birds are on the job in the day time, but the cutworm is underground during the day, coming out at night to feed on the tender tips and leaves, so if there are no toads on the job, the cutworm have a field day, or rather a field night.

Yesterday while moving some seed flats, I found one single solitary toad that somehow missed getting sprayed, and I built him a regular palace beside the compost heap, and even dug a few earthworms for his dinner. I just wish I had a hundred.

The Wisteria vine is in full bloom, a regular Niagara of blossoms, but instead of the thousands of bees that used to swarm over it, now they can be counted by dozens. Another result of my neighbor's spraying habits. Many will say, "So what of it?" I don't keep bees. Maybe not, but no bees—no pollination; no pollination—no crops. So just to play safe, I am going to keep a pan of honey and water in the garden from now until the blossoming season is over and play safe.

And while on the subject of pollination, your neighbor's gardening methods are again of concern to you, especially if you save your own seeds, for many plants are fertilized by wind-borne pollen, and even though your plants are organically grown,

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they may be pollinated by the chemically raised plants of your neighbors ....with a resulting drop in the quality of your seed.

Another little item to keep in mind is that the average chemical farmer is not as careful about weeds and pest plants as those sold on the Organic method. The weeds in their land are harder to control, due to their hardened soil, so you get the benefit of their weed seeds.

Perhaps the biggest crop that can be produced by the Organic Gardening is—FRIENDSHIP, for there is almost nothing that will bind people together in bonds of brotherhood as will a common interest in NATURAL METHODS for better health and wholesome living. I know from experience that if I hear of someone who is gardening the Organic way I will go to any trouble to meet or call him and talk organics, and that those who know that I grow things the organic way bring their friends around to get acquainted and we are all good friends from then on.

There is still another big reason why we should all be evangelists in the Organic cause and that is to EDUCATE our friends and neighbors into a better and healthier way of life.

It is up to us to do so if the job is to be done, for we have BIG BUSINESS with all its power of money fighting through every newspaper, the radio, and even by means of our government officials to sell us poisons, dusts and chemicals; even though it may mean poverty, disease and death to the people of this nation. And it does mean poverty to those farmers whose lands are ruined through "Scientific Farming" as it also means disease and death to those who eat the foods grown on chemicalized soil.

J. H. Daughtry, D.C., 219 W. 19th St. Houston, 8, Texas

—o—

NO SCAB — NO INSECTS — NO SPRAYS

One of our businessmen who has a good sized apple orchard, told me he was amazed when he went fishing in the upper peninsula of Michigan to find an old backwoodsman there who had a few apple trees that were loaded with perfect fruit—no scab—no worms—and never sprayed! He did not have any cash to buy chemicals with even if he had wanted them.

Irvin J. Blakeman
Perrysburg, Ohio

J. I. Rodale's Editorials on Cancer

are available in the back issues of Organic Gardening. Be sure not to miss these eye-opening articles on food, chemicals, and cancer. Issues available: June through January. 25c per copy. May cancer editorial available in pamphlet form for 25c.

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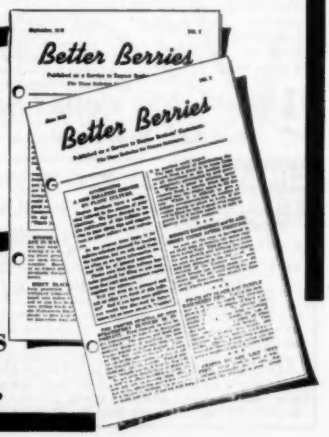

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CORN STALKS FOR COMPOST

Last fall we dug a pit some 4 x 6 ft. and about 18 in. deep; in this we put a layer of sweet corn stalks some 8 in. deep covering it with some 2 in. of manure and the same of dirt. This process was repeated until we had a pile about 3 ft. high. Some two months later (after the pile had stopped heating), we planted approximately 3,000 earthworms. About a month ago we began feeding these worms to draw them as near to the top of the pile as possible. Last week we took off the top, nine or ten inches which contained most of the worms and placed it in other compost piles. The balance of the pile was spread on our garden. The whole mass seemed to be thoroughly mixed and there were no traces of corn stalks. This was done without turning, and it looks to us like mighty good compost.

Ralph W. Soule
R. F. D., Box 211 AA
Oceanside, California

—o—

GRASS CUTTINGS AS A MULCH

I have been a reader of your magazine for several years and have practiced some of the principles of organiculture in a small way.

While a resident of St. Paul, Minnesota, I was one of the early advocates of leaving grass cuttings when mowing the lawn and was able to demonstrate that such a method produced a mat of mulch which held moisture and reduced the sprinkling bill as well, as all water was metered.

Since my arrival in California I have been trying to develop an acre of English walnut orchard into a homesite. A part of it is being devoted to gardening during my weekends, which is the only time I have available.

I have constructed two large compost bins approximately four feet wide by three feet high and eight feet long, of 1" chicken wire. I have hauled out grass cuttings and leaves that have been thrown away by householders and although I do not follow a scientific method of compost pile building, I find that in a year I have acquired a mulch which is very helpful in maintaining soil moisture during the summer when the only water available is from irrigation.

Last spring I used some of this mulch when preparing the ground for tomato plants and after transplanting, I placed a quantity of straw around the plants and did not stake them. The results were greater than last season when I tried to grow tomatoes on stakes. This year the tomatoes are large and very juicy whereas last year they were small and hard.

—o—

LEAF COMPOST

Last year I made a compost for my small garden. I used the whole leaves—then a layer of ground, 2 inches—cabbage and lettuce leaves—cow manure—then some more ground and this I repeated until I had a pile 5 ft. in diameter and 5 ft. high.

This I dug in the garden and our tomato stalks were 7 ft. high. We had all the tomatoes we could eat and also we canned a lot. We had 30 stalks. We planted the seed under a paper hat and when they were about 4 inches high we set them out in the garden, each stalk under a paper hat. When they were well rooted and developed we tore a hole in the paper hat and did not lose one plant. We did the same with pepper seeds and plants and we had all the peppers we needed. At present we have 12 yellow and red peppers ready to use and a lot of green ones.

H. B. Burdan, 332 Walnut St.
Pottstown, Pa.

—o—

LEAF AND SAWDUST COMPOST

First I want to compliment you on your magazine and tell you that I thoroughly enjoy each issue.

I planted over one acre this season with straight compost for fertilizer. This compost was made for the most part of Pecan leaves, long leaf pine straw and old sawdust. The

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composting action was hastened by Activo and I had this last spring an estimated ten tons of rich black compost. On a very sandy piece of land that has been always considered worthless I raised over 400 beautiful watermelons. The flavor was excellent, much better than that of any raised with commercial fertilizer.

The sweet potatoes grew better than ever before but the moles all but ruined the crop. Can you suggest a remedy for these pests?

Carl W. Simpson,
The Shady Lawn Rest Home
1325 York St., Aiken, S. C.

(*Editor's Note*: Moles can be trapped successfully if fresh meat is used to bait the trap. A choker-type trap placed in a runway has been found to be effective.)

—o—

GARBAGE IN COMPOST

We have been using our garbage in our compost for over a year. Our kitchen container used to cause us concern because it had a smell we could not overcome. I did not want to use the strong commercial chemicals offered for overcoming this odor. I recently started putting about 2 inches of rich loam or black earth in the bottom of the container. Now the smell is completely gone, and when I empty the garbage I automatically sprinkle a layer of earth over it from the bottom of the can. I have observed that our garbage "composts" in a fraction of the time required before I started mixing it with this light layer of bacteria-rich earth. This practice is especially helpful when one builds a pile gradually as I do.

Yours very truly,
A. R. Morse

—o—

BIRDS MUST BE REWARDED FOR THEIR HELP

With reference to birds in an Organic Garden, I have 1 acre of ground, organically treated. The bird bath and bird houses and fruit grown with compost, have made my

(*continued on page* 10)

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What's New

AT HOME AND IN THE GARDEN

Organic Shredder

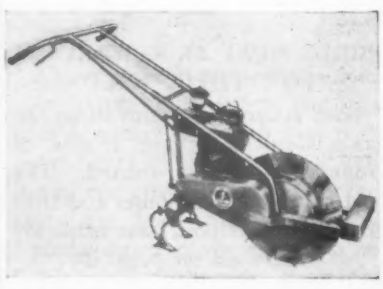
Last month the Keston Organic Shredder was introduced for the first time through national advertising media. This device shreds all type of plant materials to a size perfect for composting. Through a rotary knife action, corn stalks, weeds, almost all types of green matter may be shredded. Additional information is available by writing Organic Implements & Products Co., P. O. Box 100, Haddon Heights, N. J.

Inexpensive Garden Cultivator

A garden cultivator priced at less than $100 has recently been placed on the market. Named *Little Farmer,* this cultivator has been designed especially for use in city and farm gardens too small to make the use of full-size farm tractor equipment practical. Specifications: slightly over 100 lbs., four-cycle gasoline engine, compactly designed, carefully balanced. The manufacturer states that it may be carried in the trunk of practically any automobile when necessary. Will-Burt Co., Orrville, Ohio.

Lawn Cleaner

The "Air-Rake", introduced to the public last fall, has met with wide acclaim. This vacuum cleaner picks up all loose grass and leaves and shreds the material into a removable bag where it may be emptied into the compost heap. The "Air-Rake" does not pick up stones and large twigs or branches. Said by the manufacturer to clean the lawn 10 times faster than hand raking. Full information may be obtained from The Friedberger Company, 330 West Queen Lane, Philadelphia 44, Pa.



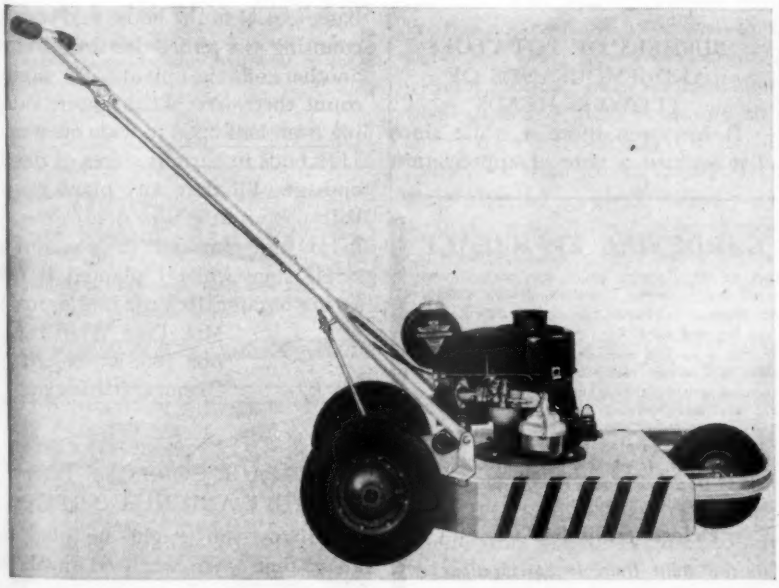
Pocket Hand Warmer

They haven't figured out yet how to do something about the weather, but there is something you can do if you're troubled by those cold winter days.

The perfect answer to frigid digits is the Pocket Heaterette—a new product about the size of a package of cigarettes and as thin as a watch. Specifically designed for outdoormen, hunters, sportsmen, and spectators, the Pocket Heaterette generates and maintains an even temperature of 125° F. for 24 hours on just one filling of ordinary lighter fluid. $3.50 each. David T. Abercrombie Co., 97 Chambers St., New York 7, New York.

Power Lawn Mower

The new Whirl-Blade Mower, powered by a vertical-shaft engine has been recently released. This mower provides direst application of its power to the horizontal blade of the type of mower. It allows for the elimination of a clutch and belt-drive, greatly simplifying the design and manufacture. "Whirlaway 20", as it is identified to the trade, is the result of two years of investigating and testing of this type of mower in laboratories and proving grounds. Specifications: 87 pounds, height adjustable from 1½" to 3", powered by Clinton V. S. 700 Series 1½ to 2 H. P. engine, verticle shaft, 4 cycle air cooled. The Moto-Mower Co., 4600 Woodward Ave., Detroit 1, Mich.



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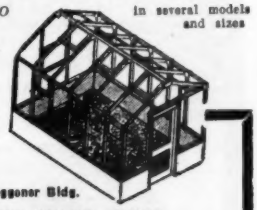

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place a bird refuge. I sometimes see 10 or 15 different species of birds sitting on the fence, waiting their turn to take a bath, and do they eat the fruit! Out of 25 grapevines, heavily laden, they pecked, ate or destroyed 2/3 of the grapes. They relish my strawberries so much, that this year I planted 1500 plants. I am sure they can't eat all the strawberries next spring. Blueberries and blackberries I just about get a taste of. I planted 5 Russian Mulberry trees to eventually give them mulberries to eat. They might then leave some fruit for me. The fruit eaters are birds of the size of catbirds, thrushes, etc. I have woods in my vicinity, and with the organic treatment of the soil, with no poison sprays used, naturally the birds will come. In previous years, I was a taxidermist, and as a solution to the fruit-eating problem, I am going to put a stuffed owl or hawk among the fruit at ripening time for a week or two. This may help next year. I want the birds, and I am willing to share with them, but I would like to have some fruit for my efforts.

I spoke about the birds to a fruit farmer. He replied, "We spray our orchards, and we hardly see any birds."

E. A. Koch, 174 Westwood Ave.
Westwood, New Jersey

—o—

BUSHELS OF POTATOES AND THOUSANDS OF FLOWER HEADS

It has been quite a while since I've written a note of appreciation for the fine work you folks are doing by publishing such a magazine as *Organic Gardening* proves to be, but I must tell you about our success this summer in raising potatoes and chrysanthemums.

Our late potatoes were grown on a small piece of ground which my husband cleared this spring. It was previously a thicket of elderberries and wild grapes. We planted less than a bushel of late potatoes and harvested at least twenty-five bushels. There were very few small ones. Two ordinary ones and seven larger ones weighed 15⅜ pounds. There was no chemical fertilizers used—it was just soil filled with humus. We saw very few bugs.

My chrysanthemums have been something to shout about and were raised on ground in our regular garden. Partly decomposed strawy manure is the only fertilizer that has been applied in the last five years. No mums better than mine have come into the city market in Lansing this year. One of my seedlings especially is worth telling about.

This is a semi-double, bronzy-peach in color. I have often read about the blossom count of this plant or that in nursery catalogs and wondered how mine would stack up against them. I first measured the width of the plant and found it was 3' 8" across. Then I cut it off at the base, took it in the house and started counting as I pulled one flower after another off the plant. By actual count there were 1225 flowers ranging from half open to wide open and 1141 buds in various stages of development. I'll dare any plant raised with chemical fertilizers to come up to my one-year old (it was just a single stem when I planted it this spring organically raised, "Lorena").

Mrs. Fred Weinert,
Box 183, Rt. No. 1,
Okemas, Michigan.

—o—

SURFACE COMPOST FOR FRUIT AND NUT TREES

Perhaps you might be glad to know that when we lived in Santa

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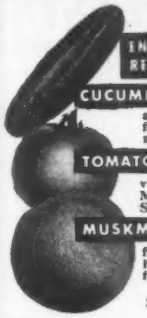

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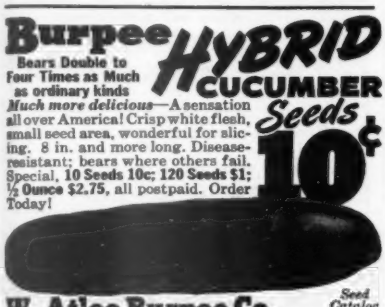

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Clara, California, we had to be somewhat careful and had to bury the leaves and table garbage. But now that we have moved to Oregon, and we do not have fussy neighbors, we do not have to bury the table garbage. When we came here last May the tall native grass was half green. Since we wanted to be rid of it for good we dug it out by the roots and piled it around the trees—two apple, two plum, two pear, one quince and two English walnut trees and fifteen different kinds of grapes. Mother says we will call this the grape place. Since the apples from the trees were poor in quality, we had much apple cuttings, besides all the other vegetable cuttings and garbage. We simply piled them on the grass around the various trees. Sometimes we did not bother even to cover them. Later in the season we got a large load of horse manure and gave each tree a large helping and mixed it up here and there. We did not turn the heap more than necessary to insert the horse manure. This fall before the leaves fell, we spread the broken down heap around, and to our surprise all the apple cuttings, even the big pieces of cabbage, had been eaten up by the huge earthworms. All had been devoured.

Now to tell you of our reward. In the first place, we had two cherry trees with a full crop of green cherries. The weather turned dry. We had a garage and wood shed that wood had been stored in for years without cleaning out. We took that wood dust and piled it around the cherry trees and two filbert trees. Of course, we watered the cherry trees daily after we piled the wood pulp around them. After the horse manure came, we mixed in a good helping of that as well as pulled grass, etc. The only care we gave any of these heaps was water most every day during the hot season. The reward, the pie cherries were sweeter, bigger, and the Royal Anns tastier. The apples turned out better, would not have been fit to eat otherwise. The nuts, this is the prize. The Gays Candy Store in Salem refused to buy

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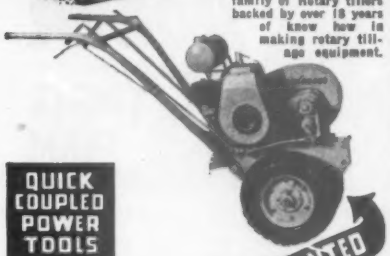

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any walnuts this year because the entire crop is a failure. They are dried-up and tasteless. We sent him a sample in a letter and he wrote back that if the nuts were all like the sample, he would like to buy them all. In a few days I brought them to the store, and was he surprised about the nuts. So we told him they were not sprayed, but fed organic matter. Our good friend in California had sent us some bay leaves and we had a few in with the walnut meats. He was surprised that bay leaves would keep the meats free from bugs and worms. Wish many more could learn how valuable leaves are, not only for compost, but also for medicine, such as black walnut leaves, which we both are still taking before breakfast and consider that our morning starter. It is an excellent tonic. We never did try the black walnut leaf tea as a spray here because so far we have not had any need for a spray, but we did try it out in Santa Clara, California, with some good results.

Just thought you would be interested to learn we can make excellent compost without extra labor. Mother says that the horse manure helps to make the ground soft so the worms can work better.

Miss Joanna Mayer, Ph.D.
317 S. Leo, Mt. Angel, Ore.

—o—

DESMODIUM AS A COVER CROP

I have been planting beggar weed (*Desmodium purpureum*) for a summer cover crop on land that I intend to use next year. In wet weather it grows very rank. I cut this before it seeds like hay as high as I can set the sickle, about 8 inches. I compost the hay and rototill the stubble, plant rye and vetch (winter hairy) in early September. Then plow under in spring. I rototill instead of disc after compost is spread with a manure spreader. The aphids have disappeared, and the codling moths do not seem to bother the apples or a wild haw tree on the

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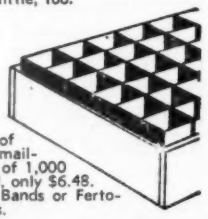

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CLARENCE B. FARGO

14 FARGO BLDG. FRENCHTOWN, N. J.

road side. There are no cabbage worms, and very few bean beetles, but the blister beetles still seem to be with me.

Mr. Jerome B. Mumma,
104 Lawn St., Dayton 5, O.

—o—

LIVING SOILS CONSUME ORGANIC MATTER

I have read in *Organic Gardening* that soil enriched with compost will devour anything thrown it. Well, here is an illustration of it.

Last fall when I cleaned up my garden I pulled out some of the sweet corn fodder. I did this to get rid of the stubble, as I do not plow or dig my garden. The sweet corn as well as the other plants had a very extensive root system and was hard to pull, so I cut off the rest of the fodder. This spring when I started planting there were no roots on the stubble and I could rake them up without any trouble. Upon examination, I found there were absolutely no roots, just the stubble setting on top of the ground. It seems as soon as the stalk is dead the ground starts to eat up the roots. Another illustration: I use old newspaper to mulch my garden and cover the papers with straw. The papers make the straw go farther. When I began this method I would use two thicknesses of paper and some of the paper would be left the next year. Now I use four thicknesses and it all disappears during the summer. But it still answers the purpose very well. I have been using compost for about five years.

C. E. Briggs,
R. F. D. No. 2, Box 99,
Jersey Shore, Penna.

—o—

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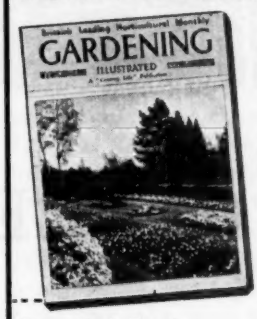

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CANCER — PART X — SALT

AT THE head of this chapter I wish to quote one long sentence from the book, *Cancer,* by Dr. A. T. Brand:

"What I consider to be one great barrier to the discovery of the cause of cancer, is the apparently universal feeling that this cause is dreadfully recondite and complex, whereas it may, and probably will, be found to be excessively simple with nothing specially mysterious about it."

The more I delve into, read and study about cancer the more I come to the conclusion that the more complicated cancer itself is, the simpler will ultimately be found to be its basic causes. Eventually medical science is bound to discover these fundamental simple incitements to the involved problem of cancer.

A few weeks ago if you were to have told me that such a simple item in the diet as table salt (sodium chloride) was one of the suspected causes of cancer I might have reacted skeptically, but today after checking the existing medical research and opinion on this point I think there is a good deal to be said for it.

A few years ago I went to St. Petersburg, Florida and met a woman who had had arthritis. She told me that her doctor had strongly urged upon her a completely salt free diet and that along with other treatments she was practically completely cured. She also had to drastically and completely eliminate white sugar, and foods that contained it. In the last few years several of my friends who were suffering from high blood-pressure were told by their physicians to eliminate all salt from their diet. A few days ago a friend of mine who has heart trouble was told to eliminate salt completely from his diet. In kidney trouble salt is banned. Another friend who had a paralytic stroke was ordered to eat a salt-free diet. Incidentally, her husband asked the doctor, "Must I wait until I get a stroke to cut out salt or should I follow the same diet as my wife?" The doctor told him to cut it out also, as a preventive measure.

Now, all the diseases just mentioned are in the degenerative classification and it seems to be standard medical practice today to outlaw salt in their treatment. Then why not ascertain if salt should not be put under the ban by everyone, before arthritis, high blood pressure, heart disease, kidney trouble and strokes of paralysis show their ugly faces?

HIGH BLOOD PRESSURE AND SALT

In the June 4, 1949 issue of the Journal of the American Medical Association there is an article entitled *Hypertension and the Saltless Diet.* Hypertension means high blood pressure. Here are some of the facts in it: Animal experiments conclusively prove the increase of blood pressure by the feeding of salt and the benefits obtained by eliminating salt are not restricted merely to pressure reduction. There is "frequent clearing of retinitis, congestive failure, headaches, dyspnea and other symptons."

In this article, Dr. Frederick M. Allen, who introduced the low salt diet for high blood pressure into this country in 1922 says: "My conclusion, based on unique experience in several thousand cases during 28 years, is that saltless diets, especially when begun reasonably early, can specifically arrest progressiveness, prevent complications and thus provide the first real control of deaths from hypertension."

Being interested in the subject of cancer I went to New York and ran through the list of books on this subject at the library of the N. Y. Academy of Medicine. I saw several mentions of salt specifically with cancer and recalling the many instances in which doctors had prescribed against it, I decided to read up on the the subject.

DR. JAMES BRAITHWAITE

One of the earliest writers on salt and cancer was James Braithwaite, M. D. of Leeds, England who wrote about 1902 a book called *Excess of Salt in the Diet and 3 other factors, the probable causes of Cancer.* For

three months Braithwaite kept a woman who had cancer of the breast almost entirely without salt. "She was allowed to drink ordinary water, but I find that, against orders, her daughter has put a mere pinch of salt in the bread.....The tumor, which had grown so rapidly as to be of considerable size within 3 months, was at once arrested in growth, remained stationary for about 6 weeks, and then decreased in size up to the last time I saw her on Feb. 10. The diminution in diameter between January 13 and Feb. 10 was about ⅛ of an inch. The diameter of the tumor is now 2⅜ inches.....There was a patch of skin the size of a shilling infiltrated with the disease and closely attached to the tumor. This has become loose and can now be pinched up and raised from it.....

"[March 7. — Since correcting proof, the patient has returned home, and I have seen her today and find the tumor again increased in size—the diameter being 3¼ inches. She has, however, taken salt daily, although in small quantities. She says she 'cannot eat her food without it']."

Braithwaite says that salt harms because it is not a food but an inorganic chemical. It is a stimulant to cell metabolism and in oversupply is dangerous. It is a powerful stimulator of the metamorphosis of tissue. In other words, salt is not a food but an inorganic chemical stimulant.

MR. MARWOOD

Around 1910 comes Frederick T. Marwood, a layman, with his book *"What is the Root Cause of Cancer—Is it the Excessive Consumption of Common Salt, Salted Foods and Salt Compounds?* Marwood " investigated over one hundred cancer deaths, and in every instance, excepting one, I have found the victims have been abnormally fond of salt and salted foods, or had taken aperient salts daily for many years. The exceptional case referred to, was one of a female, who, as far as I could trace, had not shown any particular partiality for salt, but was admittedly a "big eater" which, with normal modern diet, implies an extra consumption of salt."

Marwood says further: "some interesting diet experiments in connection with salt have been carried out on rats and mice, by Mr. Milo Hastings, Physical Culture Research Laboratory, Broadway, N. Y.—in which it was demonstrated that a little salt was beneficial, with an oversalted diet one lot of these animals deteriorated physically very considerably, but with a little salt, another section thrived." Again Marwood says: "Is there any wonder that an American doctor should write to the *Daily Express*:—

"Is the eating of salt a peril to health?"

"During the last few years, the death-rate in America from nephritis, Bright's Disease, heart disease, and kidney disease, has increased far more than that in England, and it is suggested, that the explanation lies in the heavier consumption of salt in the United States."

"There is no doubt at all, that the average person eats far more salt than the system requires. Salt ages people. It is the enemy of good digestion, and it is a prolific cause of stomach, kidney and nerve impairments."

DR. L. DUNCAN BULKLEY

The third reference to salt in the library of the N.Y. Academy of Medicine was an article written by L. Ducan Bulkley, M.D. in the medical journal called *Cancer* published under the auspices of the American Association for the Prevention and Cure of Cancer, and please note that L. Ducan Bulkley was the editor of this medical journal. His article was the editorial in the issue of July, 1927. I am going to quote from it:

"Recently a very intelligent lady, aged 46, from the West, whom I was attending for cancer of the breast, on inquiry as to how she was doing since her previous visit, remarked very simply 'that she had improved and that the breast had improved much and was softer since she had left off the use of salt and sugar.' In directing her diet I had never mentioned salt, and could not learn why she had made the change. I could understand why the absence of much white sugar could be of great advantage to her cancer, but the matter of salt, as mentioned, I did not give a thought to. So the thing went from my mind, until this evening, when reading some printed material from Mr. Frederick Marwood of Blackburn, England, whose book "What Is the Cause of Cancer? Is it the Excessive Use of Common Salt, Salted Foods, and Salt Compounds?" (which book was reviewed in CANCER, Vol. III No. 2, January, 1926), brought the incident to my mind.

"I may add that another lady patient, aged about 50, with cancer of the breast, has just been directed very carefully to cut out all salt, and to make no other change in the treatment, and we will see the result in a couple of weeks, no longer.

"It is interesting to note here that the late Dr. Braithwaite of Leeds, England, urged the same proposition as Mr. Marwood, in 1901, of which Mr. Marwood gives an abstract at the end of his book. He also gives a lot of confirmatory evidence from many competent observers in the printed matter already referred to, which no doubt he would be glad to send to anyone writing to him.

"It is interesting to consider some of the supplemental proof which Mr. Marwood has printed in the sheets referred to: The eminent statistician, Frederick L. Hoffman, LL.D., wrote tc Mr. Marwood the following: 'During my late investigation in Mexico, I found that where cancer was relatively rare, salt consumption was as relatively rare. Mexicans as well as Indians use relatively small quantities of salt compared with the excessive consumption in this country, i.e. United States.' "

Please note that in the third installment of this series entitled *Primitive Peoples,* I drew attention to the low incidence of cancer among the Navajos of Arizona and New Mexico. It is possible that they use

less salt than the average American. Dr. Bulkley goes on: "Mr. Marwood quotes the well known writer on cancer, Dr. Shaw MacKenzie, as saying: 'In several cases recently seen, inquiry has exhibited the fact that salt has been taken in excess.'

"Mr. Marwood also quotes a number of writers who speak strongly of the effect of salt on high blood pressure, and of its injurious effects on weakened kidneys.

"We know that chloride of sodium, NaCl, is one of the constituents of the blood, but its proportion in health and serious disease is not certain. The elaborate work of Wesslow on the blood does not mention cancer or carcinosis. Forbes Ross, formerly a cancer surgeon, in his wonderful book on *Cancer, the Problem of Its Genesis and Treatment*, after abandoning surgery, and after spending ten years in constant microscopical, clinical, and chemical research, advanced the hypothesis that cancer is due to a want of balance in particular mineral salts in the body, and that the disturbance in this balance leads to the disorderly growth of malignant tissues. Possibly the presence of chloride of sodium, taken with the food, disturbs this balance and produces what is known as 'Carcinoma' (epiblastic and hypoblastic)."

After going into an involved discussion on the disturbance of the potash balance in the body and its effect in producing cancer, Dr. Bulkley says: "From all this it may be understood how chloride of sodium, or common salt, in any excess with the food may disturb the balance of the mineral ingredients of the blood, replacing the tissue of the cells when worn out, instead of a potassium salt, thus starting them on their riotous, malignant action, in response to local irritation, and ending in fully developed cancer: Naturally also if the cells are wrongly nourished they will keep up this morbid action until life is destroyed.

"Mr. Marwood recently took an account of the consumption of cooking and table salt in his own household, consisting on an average of twelve persons. He found that it amounted to 4 pounds per head a year; this in addition to the usual salted foods and occasional saline aperients. In closing his account of 'Household Salt Consumption,' in a recent contribution, he says, 'My own opinion, based entirely on the views of scientific writers, is that one-quarter of an ounce of salt per week, or one pound per head, each year, is ample to supply the body with the actual needs in the replacing of chloride of sodium lost in modern methods of cooking and the preparation of food,' and also added, 'What would happen to electrical storage batteries if we added sulphuric acid greatly in excess of the necessary formulas, seems to me, will happen in another degree to our internal storage batteries, if we ingest a powerful corrosive chemical, sodium chloride to the extent of 10, 20, 30 times, or even more, than nature has prescribed.'

"As this writing is being finished, a third, a very intelligent lady patient of about 50 years of age, with cancer of the breast, doing well under treatment, was in the office, and when the subject of salt in connection with cancer was menitoned, she remarked quite innocently, 'I do not think that my breast would be nearly so well as it is if I had not abandoned salt and I have now no craving for salt, nor any use for it.' The subject of salt had not been previously mentioned to her, so the leaven is working."

When I returned home I discovered that in Hoffman's book, *Cancer & Diet*, a copy of which I own, there was a great deal of incriminating information against salt and cancer, which I am going to mention now:

HOFFMAN

On Page 181 Hoffman says: "Marwood has tabulated the viewpoints of authorities condemning table salt as a poison or prejudicial to health, starting with Dr. Taylor of London, 1839, and including Dr. Edward Smith of London, who in his 'Practical Dietary' uttered a note of warning in 1865, Dr. Robert Hutchinson, 1893, Mrs. Leigh Hunt Wallace who wrote on *Salt in Relation to Health and Disease* in 1898,.....and Dr. Clement Jeffery, London, 1925.

"At the beginning of the century there were several important papers on salt as a predisposing factor in cancer causation, initiated by a discussion in the London Lancet by M. Bernstein who discussed the question of excess salt in the diet as a probable factor in the causation of cancer."

Hoffman continues: "The viewpoint of Marwood was accepted, among others, by Sir R. Douglas Powell, in the statement that: I think you have done a service in drawing attention to this as a possible factor in the causation of cancer, and I admire the caution and restraint with which you produce the results of your inquiries, extended over so many years. Marwood also quotes Dr. Hindhede of Copenhagen, the foremost Danish authority on diet, to the effect that: 'I have read your paper with great interest. I think you are right that salt is one of the causes, perhaps a very significant one.'"

Hoffman continues:

"I can only refer very briefly to an important paper on 'Saline Waters and the Use and Abuse of Common Salt,' by R. Ackerly, M. B., contributed to the Proceedings of the Royal Society of Medicine, 1910. The general conclusion is advanced that the excessive salt consumption of the present day among practically all civilized people is not because of inherent necessity for dietary or nutritional purposes, but because of the acquirement of a habit or an acquired taste, which evidently demands far reaching correction. Ackerly remarks: 'So far as I can make out from researches into the statements of physiologists, all the salt that the body requires daily is at most 2 grm. to 3 grm., and considerably more than this is contained in our food without artificial addition.....According to Ackerly, the average quantity of salt taken by western nations is

from 15 to 20 grm., seven to ten times as much as is necessary, and this quantity is frequently exceeded."

Hoffman quotes Dr. A. Von Gerhardt in 1912 as having said that all salty and highly spiced dishes and meat make cancer worse. In 1917 Lieut. Colonel Wm. H. Hildebrand of the Indian Army, in his book *The Cause, Prevention and Treatment of Cancer and Other Diseases,* said: "I understand that taking salt without food by a cancer patient actually aggravates the disease or that the disease improves if no salt is eaten; so the above may be the reason, or there must be some other reason for salt being injurious to cancer."

At the Homoeopathic Congress, London, 1924, Dr. Wynne Thomas said: "I really think that the enormous amount of salts taken by civilized nations, has a great deal to do with the prevalence of cancer." Hoffman quotes Dr. E. Friedberger of Berlin in 1928 in an address delivered before the Society of Digestive Diseases and Metabolism in Amsterdam as referring to the excess intake of table salt and its dangers. An important reference is to Dr. Behnhard Fischer-Wasels, Director of the Pathological Institute of the University of Frankfort. Hoffman says regarding this doctor's work:

REASONS

"Next he considers a diet rich in water and fluids is dangerous because it produces alkaloses of the blood which again favors cancer cell growth. The tissue of the tumor contains a larger amount of fluid proportionately than any tissue in the body. Since table salt increases tumor growth in animal experimentation, he advises cancer patients and persons in danger of contracting cancer as the result of a cancerous predisposition to limit themselves to a table-salt-free diet.....and a limited fluid intake." Salt has the property of keeping fluid about it and is therefore contra-indicated for two reasons.

Hoffman himself, who has studied the worldwide use of salt by Nations and tribes, says: "Those who believe that excessive salt consumption is a factor in cancer causation may derive much support for their views from the fact that a low rate of salt consumption coincides with a low rate of frequency in cancer occurrence." On Page 184 of his book Hoffman places himself in the category of "Those who believe that excessive salt consumption is a factor in cancer causation" by saying "I can see enough consistency in the viewpoint of Marwood and others that the excessive use of common table salt under the conditions stated may prove a contributory factor in the causation of malignant tumors."

MORE REASONS

I have given some quotations which offer reasons why table salt is bad for the human organism. I have noted others in the reading of medical books and articles. Here is an item which represents a clipping from a health magazine, but the source and author were not noted:

"The salt-eating habit is one of the most persistent and widespread dietary vices of the human race, and one which is responsible for more diseases than is the consumption of any other single article of food. According to Professor Sherman, soon after eating salt, the body gives off through the urine practically the same quantity of salt as was consumed, showing that the organism can not utilize *inorganic* sodium chloride, but expells it as it does any inorganic poison. But in passing out of the blood from the kidneys, this salt injures the delicate nephritic tubules of these organs, and is a cause for their eventual break-down. Also in passing through the heart, in solution in the blood, salt injures the heart; it causes excessive irritation of the heart muscles, increasing the heart beat and heightening the blood pressure."

Professor Sherman, of Columbia University, is one of the world's outstanding authorities on nutrition.

Dr. John A. Shaw-Mackenzie, in his book *The Nature and Treatment of Cancer* (1906) says: "In several cases recently seen, inquiry has elicited the fact that salt has been taken in excess, as also there has been a craving for acids. In one case the patient informed me he had long thought he was taking too much salt, and that it must be deleterious. This popular belief has an element of truth in it. If cancer cells take from the blood for their own purposes those substances from which the organism usually forms hydrochloric acid in aid of its gastric digestion (J. Beard), it is probable that salt and chlorides are contra-indicated. In two carcinomatous patients their conditions appeared to be aggravated by change to the seaside." There might be a tendency for a doctor to send a cancer patient to the seashore on account of its healthful atmosphere, but if he is going to breathe in salt and salt is found to be an irritant in cancer, this practice probably should not be resorted to.

In another case I noted a statement in a medical article that there was an oversupply of chlorides always found in cancerous tissues leading to the implication that it might come from the chloride portion of the salt (sodium chloride). But according to Dr. Sherman the salt leaves the body as is and does not break down. Another authority says: "The most important function of salt seems to be the formation of hydrochloric acid, the acid in the gastric juice," suggesting therefore that salt breaks down in the body to sodium and chlorides (chlorine).

Another says: "Salt controls the density of the blood, maintaining it in a condition conducive to health. It induces the formation of cells and increases bodily weight." If it induces the formation of cells, we may be coming close to the connection between salt and cancer. Does an oversupply of salt cause an abnormal formation of cells? In cancer you have the formation of too many cells.

Dr. Sherman says also that the use of salt may be a factor or a disturbance in the osmotic pressure of tissues. This is an important func-

tion which involves almost every portion of the body.

Dr. Ackerley, who was mentioned previously, sums up the injurious effects of excessive salt intake in the following four observations:

1. From throwing upon the excretory organs wholly unnecessary work;
2. From impregnating the fluids and tissues of the body with a proportion of one salt only, far in excess of its needs;
3. From the retention in the body of compensating fluid;
4. From the necessity thrown on other organs of getting rid of this large amount of what is truly not required—a foreign body."

Sherman in his book *Chemistry of Food and Nutrition* says: "Moderate variations in the amount of salt taken have no immediate significant effect upon metabolism. Large amounts increase the quanity of protein catabolized, and through overstimulating the digestive tract, may also interfere with the absorption and utilization of the food. Current medical opinion favors the diminished intake of sodium chloride after the age of forty or thereabouts, as it is believed to contribute to the tendency to increase blood pressure." There is no question that since the efficient functioning of the entire body depends on the blood, its circulation and makeup, abnormalities in the pressure may be intimately related to and lead to the causation of many other diseases, including cancer.

Here is a phase of the salt problem which is usually overlooked. In an article in the *Analyst* (June 1926) Rappin and Grasseron say: "Refined salt from various sources was found to contain up to 8,300 bacteria and 400 mould (spores) and although the majority of the organisms were saprophytic, toxic cultures were obtained in some cases. Brines of various sources and ages were badly contaminated. The authors concluded that for food preservation purposes the salt should be free from bacterial contamination and should be prepared only under aseptic conditions."

Hoffman comments on this item by saying: "If this should be substantiated, it might be a clue to the injurious effects of common salt in introducing irritating bacteria into the human body, directly operating as causative factors in tumor growth."

PREGNANCY AND SALT

I want to submit herewith an item that appeared in a medical publication called Hospital Topics, in 1940, and, by the way, it comes from my own medical clipping file which I accumulated when I was editor of the magazine called *Health Guide* about ten years ago:

"In the mind of the patient, the duration of labor and severity of its pain are the two most important factors of pregnancy.

"Having used a salt-free diet in many cases of toxemia of pregnancy, Wadlow, of St. Joseph, Mo., noted that the labor was usually of short duration, and the pains were not severe. He therefore decided to try a salt-poor diet in normal cases as a prophylaxis against long and painful deliveries.

"A series of 70 patients on this diet is reported in *American Journal of Obstetrics and Gynecology*, May, 1940. It was found that a definite reduction in length of labor appeared when a low-salt diet was given during the latter weeks of pregnancy. Comparative tables compiled by the author indicate that both primaparae and multiparae benefited by the change in diet. The severity of the pains, although not as easily measured as the duration of labor, was undoubtedly decreased in most of the cases.

"While a physiologic explanation of Wadlow's observations has not been worked out in detail, the author believes that a dehydration of maternal tissues is the most important physiological effect. The result is a reduction in excitability of the nerve centers and a definite sedative effect, due to decreased sodium and chloride ions.

"There is no untoward effect on lactation and post-partum recovery from this diet. Babies were of average weight."

Is this why the women of savage races have such a simple time with child-bearing?

SALT AND OBESITY

It is standard practice in reducing diets for doctors to suggest a drastic reduction in salt intake. This should be done for at least three reasons. First, salt in the body gathers water about it, thus causing water retention which adds to the weight. Secondly it excites the thirst, making for intake of water. Thirdly it causes an increased flow of saliva, creating appetite and greater desire for food.

SALT AND HEAT

Of recent years it has become the fashion for people to take salt tablets in hot weather to prevent heat shock or prostration. It started with steel workers who have to stand in front of searing furnaces. In such cases such an extreme dehydration takes place that there is a serious loss of salt from the body and probably there must be a replacement. But in the steel mills the condition is treated by injecting salt solutions into the veins of the workers and not by salt tablets.

This does not mean that everyone should run and take salt tablets during hot weather. I would like to reprint an item here from Time magazine of August 24, 1949 which throws some light on salt and heat:

"One of the summer's most annoying complaints is prickly heat. Affecting children and adults alike, it is marked by scattered outbreaks of small red skin blisters which itch and burn. The condition may last for several weeks.

"Medically speaking, prickly heat is an acute inflammation of the sweat glands. It usually occurs on confined skin areas when summer heat begins. Many doctors prescribe this treatment: Wash with dilute alcohol and powder the affected areas; avoid too heavy clothing.

"An added note on how this itching and burning condition may be eased was offered last week in the British journal Lancet by Drs. G. O. Horne and R. H. Mole of the Royal Infirmary in Edinburg. Reporting on experiments they had made in Karachi, India, they linked occurrences of prickly heat with the amount of ordinary salt eaten by the affected person. (Many people in the United States and other countries throughout the world swallow salt tablets during the summer to replace body salt lost through prespiration.) Their studies showed, the doctors said, that the rashlike outbreaks could be relieved by cutting down on the salt eaten by the patient while at the same time boosting his water intake.

"Ten hospital staff members were the 'guinea pigs' for the investigations, carried out over a period of several months in the hot, humid Indian summer. In the water-drinking phase of the experiment, the patients gulped down 8 to 12 pints a day, in addition to their regular quota. When emphasis was switched to salt intake, each supplemented his daily diet with an extra 10 to 15 grams (about half an ounce).

"By checking the patients frequently, Drs. Horne and Mole found that their prickly heat usually showed definite improvement two or three days after increasing the water intake. In eight of the ten the condition was eventually improved or completely relieved. The doctors also discovered prickly heat hit five patients again when salt intake jumped and water drinking was cut down.

"To see if he could pin down the irritating agent Dr. Horne—one of the 'guinea pigs' himself—tried adding different sodium salts to his diet (table salt is sodium chloride). Prickly heat followed. He then substituted ammonium chloride, also a salt, and got no prickly-heat reaction.

"Based on the outcome of this test, the doctors offered the 'suggestion' that sodium is the irritating agent in prickly heat. But they added this warning: 'In the absence of a fuller understanding of the relative importance of the chloride and sodium ions, it may not be easy to strike a balance between the prevention of chloride deficiency and the prevention of prickly heat.'"

BAKER'S DISEASE

A condition called "baker's dermatitis," a serious skin ailment, has been attributed to salt, that is, the kneading of dough containing salt, causes this disease. One writer has said that common salt should be considered in the same class as the chemicals on the druggist's shelf. It is the sodium salt of chlorine. It is no more a food than the potassium salt (potassium chloride), or the magnesium salt (magnesium chloride), but perverted dietary habits have sanctioned its use.

A few months ago I began to take particular notice of the mention of chemicals on labels and cans of food products. I was shocked to see that even in such a simple, elemental thing as salt, the hand of the chemist was to be felt. On our box of salt was the following list of items added: .01% potassium iodide, .05% sodium bicarbonate, .90% tricalcium phosphate, and .04% dextrose. On other brands I have seen other chemicals added to make it pour easier. We searched around and bought some coarse, loose salt, which we used from a small open dish. I presume it contained nothing but the sodium chloride, but today you cannot be sure, especially if it is a product which originates in your own state, for it is only the federal laws that require the marking of such things on the package or can. I recenty read that pepper has been adulterated with salt. In containers labled "pure black pepper," officials of the Bureau of Foods and Chemistry of Pennsylvania found no pepper whatever, but have discovered as high as 46 per cent of the mixture to be common table salt, imitation pepper flavoring, sand and finely ground cereals such as buckwheat, and cottonseed hulls which gave a black appearance.

PRIMITIVE MAN AND SALT

There is a fallacy prevalent that man must use artificial salt in his diet to live, that it is necessary for the assimilation of food. That is utter nonsense. There are many African tribes that thrive without it. The Eskimos hate salt, until they begin to live with whites and only gradually learn to like it. Vilhjalmur Stefansson, the famed Arctic explorer, in his book, *My Life with the Eskimo*, relates that when Eskimo visitors came too often to the expedition's encampment and brought with them voracious appetites which threatened to clean out the white man's larder, the Arctic adventurers would place a pinch of salt in the food—and the Eskimo would speedily depart for his own home where the fare was more tasty.

The Islanders of Tristan da Cunha eat practically no salt and are extremely healthy, in fact, one of the healthiest races in the world. The Hunzas of Northern India, about whom I have written a book called *The Healthy Hunzas* (Rodale Press, Emmaus, Pa.), do not eat salt. They are in a valley cut off from the outside world and eat only what they raise themselves. Sir Robert McCarrison, a research medical scientist, who lived among them for eleven years did not see one case of cancer among them. They are the healthiest people in the world, with practically no disease of any kind. They of course grow their food by the organic method, using no chemical fertilizers.

True salt has always been a popular part of the diet of most of mankind. The word salary comes from the word salt. The Roman soldiers were sometimes paid off in salt. Wars have been fought over salt deposits. The Bible mentions the salt of the covenant which denotes the communion which the Israelites had with God, salt being a symbol of friendship and incorruption.

In the sermon on the mount, however, Christ said, "Ye are the salt of the earth: but if the salt has lost his savour, wherewith shall it be salt-

ed? it is thenceforth good for nothing, but to be cast out, and to be trodden under foot of man."

Has not the salt lost its savour, based on the evidence we have seen in this chapter? Should not salt be cast out of our dietary and be trodden under the feet of men? I think so.

Would it be helpful in the alleviation of the fears of parents that their children may contact polio to eliminate salt out of their children's diet. I think so. In my opinion salt should be excluded from everyone's diet, be he healthy or not.

FORBIDDEN FOOD

The following is a list of forbidden food I find in a printed list furnished by a physician to a patient who must eat a low salt diet:

Processed meats such as salted, smoked, canned, spiced and pickled meats, Bacon, ham, sausages, bologna, shell fish (clams, oysters, lobster, shrimp) processed fish, frankfurters, liverwurst, salami, canned vegetables (unless specially packed without salt), beets, celery, endive, kale, spinach, sauerkraut, broths, meat soups, regular commercial bread and rolls, salted crackers, pretzels, salted peanuts, all salted cheeses, commercial ice cream and salted butter. Also forbidden are olives, raisins, catsup, mayonnaise, pickles, relish, salted meat gravy and salted meat sauce.

This list is for sick people who have to be extremely strict. An ordinary healthy person can use his or her judgment as to how far they wish to go. Remember that in their raw state fruits, vegetables and cereals naturally provide all the vital food salts we need for our well-being and preservation—also, if a person will go to a little pains to figure out an appetizing diet, the saltless features of it will be easier to take.

Wouldn't it be sensational if man found that disease could be tremendously diminished by such a simple thing as eliminating salt from our diet. It might have tremendous implications. Cancer has been known from earliest times, but so has salt. It certainly is worthwhile checking into by the various cancer research organizations.

As this article goes to press a friend tells me that he was cured of the hives on instructions by his physician to cut out all salt.

(To be continued—Next article *Sugar and Cancer.*)

Editor's Note: This entire series may be reprinted free of charge by any newspaper or magazine.

Organic Soils Behave Differently

by DR. EHRENFRIED E. PFEIFFER

Director of Biochemical Research Laboratory, and author of Earth's Face and Human Destiny, Biodynamic Farming and Gardening, et al.

A SOIL is considered good if it has at least 2% organic matter, very good if it has between 3 and 5%. Today, in the United States, the average organic content is near 1.5%, many agricultural soils are below this level. Any soil with an organic matter content less than 1% is endangered, tends toward erosion.

Most of our knowledge of the chemical treatment of soils is based on studies of below average soils. Available nitrogen, phosphate and potassium are tested for in soils which do not "hold" these minerals, but let them slip away because there is no absorbent organic and/or colloidal matter present. Here, the Liebig theory is fully applicable, for minerals in a mineralized soil behave as they do in nutrient solutions—they are available. If there are none available, then they just aren't there. When, for one reason or another, they become unavailable it takes a long time for the natural, life process of the soil to make them accessible again. If these available supplies of minerals are exhausted they have to be replaced. The soil chemist is quite correct here, when he tells you that the lost minerals must be added again. The test for available minerals, therefore, gives a fair picture of the situation in mineralized soils.

In soils with a high organic matter, and especially with a high humus content, the state of affairs is entirely different. This puzzle was first called to our attention by a soil which showed a low availability of potassium and phosphate, yet produced a full crop with no deficiency symptoms whatsoever. According to the rules, this soil should have been fertilized with potassium and phosphates. Judging by the crops it produced it did not need these. Why? A total chemical analysis of this soil showed that it still contained 50,000 lbs. of potassium per acre, while of the available potassium there was only a trace. In this case the potas-

sium was not soluble (unavailable) being fixed in mineral and organic form. The quick extraction methods used for the testing of available minerals did not find the unavailable fraction of potassium. Nevertheless, there was potassium present in the soil. Since the plants did not evidence any symptoms of potassium deficiency it can be assumed that they had a means of getting at the potassium and making use of it. In other words, plants must have a way of extracting the unavailable fraction from the soil, both from the mineral as well as from the organic sources. Bacteria undoubtedly play a role there too.

On the other hand, plant growth is something quite different when it takes place in a nutritive solution or a mineralized soil. I link these two growth media because they are very similar in their behavior. A deficiency in either of these is an absolute deficiency. While, in an organic soil, a deficiency of the so-called available fraction is only relative—dependent upon the method of extraction being used. In such a soil, the extracting methods of the plants and bacteria are able to get at the unavailable fraction.

If the organic matter present is not in a raw, but in a digested form, i.e. in the form of humus, it has a high factor of absorption. It is the colloidal form of humus, of course, which has this absorptive capacity. Clay is also a colloid and behaves in very much the same way. Translated into terms of weight, 1% organic matter in a soil means about 40,000 lbs. per acre; 2% organic matter 80,000 lbs.; 3% organic matter, 120,000 lbs.; 4% organic matter, 160,000 lbs. Since colloidal humus can absorb up to 2 times its own weight in moisture (sometimes even 2½ times its own weight), the amount of water present in such a soil will be double the amount of organic matter. This water in soils carries soluble minerals which are thus also absorbed by the organic matter. In other words, a soil with 3% organic matter can absorb 240,000 lbs. of moisture (plus minerals in solution) as against a soil with 1% organic matter, which will take up and retain only one third as much. This may also help to explain why organic soils behave differently. Their hidden resources are considerably greater than those with low organic matter, i.e. mineralized soils. Soil testing with quick extraction methods will not necessarily reveal the hidden reserves of a soil with high organic matter content.

We mentioned above that clay has a behavior pattern which is similar to that of organic matter. Indeed, clay soils are in a way more "elastic" in their absorption and retention of moisture and minerals than light, sandy soils. It is also easier to maintain the organic matter content of clay soils. However, it takes a longer period of time to increase the organic matter content of clay soils too. Some years ago, a German experimental station made studies of the effect of additions of clay to fermenting manure and compost. (The clay was added in very thin layers as we used to interlayer the lime additions to compost.) It was found that these small amounts of clay helped to improve the fermentation of manure. It rotted better, and losses of soluble minerals (potassium for one, and also nitrogen) were considerably decreased just through sprinkling some clay over the manure while building up the heap.

It may be a commendable practice to add some clay to your compost, particularly if the soil you work with is a light sandy one. Some twenty years ago, I frequently recommended suspending clay in water and spraying it over garden beds in sandy soils with a low "holding" capacity. There is, however, one condition attached to making this practice effective. All colloids, both organic and mineral, coagulate in the presence of acids. Hence, one must take care that the soil or compost reaction is better than pH 6. If the soil or compost is in the acid range below pH 6, f.i. 5.0 or 5.5, this measure will not be of much help.

To return to the problem of finding out what really is in a soil, it seems that emission spectrographic methods may tell us more about the actual contents. If, in addition, we test the available minerals, the organic matter, the water absorption and holding capacity of a given soil, and determine the bacterial activity present there, then we may come nearer the reality.

An interesting problem, in this connection, is concerned with the "mineral-holding capacity" of a soil. I have been making an intensive study of this problem and am preparing a detailed report with substantiating figures. For the present, it is perhaps sufficient, as a preliminary statement, to point out that one can wash out a soil by frequent percolation until the filtrate no longer contains any minerals in solution. In many cases, the analysis of the soil before and after the washings does not correspond with the amount of minerals washed out. The holding capacity is quite different in soils with a high organic matter content from that of soils with low organic matter. In fact, a soil with high organic matter loses very little through washing out. In the same procedure, a soil plus soluble mineral fertilizer loses not only the added minerals, but quite a bit of its own hidden reserves too. Some of these are transformed into an available, soluble form, especially potassium, phosphates and magnesium. The losses of potassium and magnesium * are particularly striking.

One can pour seven times their weight in water through soils with high organic matter, in 12 washings, (in our experiments) and not lose any appreciable amount of minerals. With mineralized soils it is quite a different matter. Such results demand that soil research be widened in order to do justice to organic soils.

* Most of the eastern soils which we have analyzed were so deficient in magnesium that we would recommend the use of dolomite instead of lime as a general practice.

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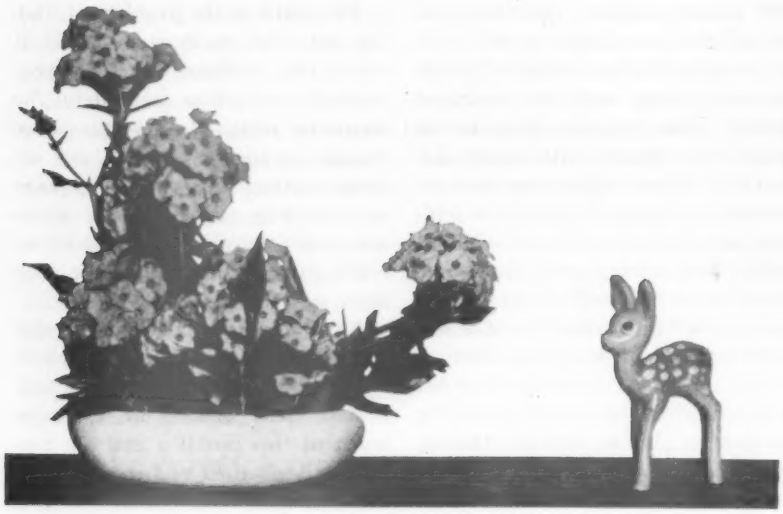

An Oscar for Phlox

Phlox Forms the Backbone of the Summer Garden

by W. MARVIN LUNDY

YOU may search where you will, say what you will, but after all is said and done, Phlox still holds its head highest as an indispensable in every garden from coast to coast.

My interest was first aroused in Phlox several years ago by my grandmother when she received so much enjoyment out of growing the annual variety. I now grow the hardy varieties exclusively as they produce much larger heads of flowers, and, of course, do not require planting each year.

A very desirable feature of these flowers is their ability to produce blossoms over a long period. Their blossoms begin unfolding in early spring and provide a continuous array of beauty throughout the spring and summer season.

No other plant has so many desirable attributes or adapts itself so happily to all gardens. I know of scarcely any other hardy plant that needs as little attention or grows as prolifically and flowers so long. Phlox really provides the "backbone" of the summer garden. To grow it well the soil should be well drained, deeply spaded and have a goodly amount of compost added. It may be planted in the fall or spring in a sunny location. I have found that it makes a beautiful foundation planting on the east and south side of the garage, furnishing a beautiful color contrast to a white background.

The plants require very little, if any, protection during the winter. They should, however, be dug up and divided every three or four years or they will become too crowded and as a result will have poor, small flowers. They should never be let go to seed, nor should they be watered overhead. When watering becomes necessary, let the hose run slowly on the ground and thus keep the blooms and foliage dry. This method will prevent mildew.

The natural growth of Phlox is to produce a large main head of blossoms, but quite by accident I discovered that they can be topped in early spring, which causes them to branch out and produce more and smaller clusters. Many times children become careless, as have mine.

They accidentally broke out the tops of some of my plants. I thought they were done for but to my surprise they sent out side sprigs and I immediately liked the different effect it produced. I recommend that the reader try it some time on purpose.

Phlox are versatile and congenial as they lend themselves to many arrangements according to the individual desire. Their vivid colors are sure to make a lasting impression

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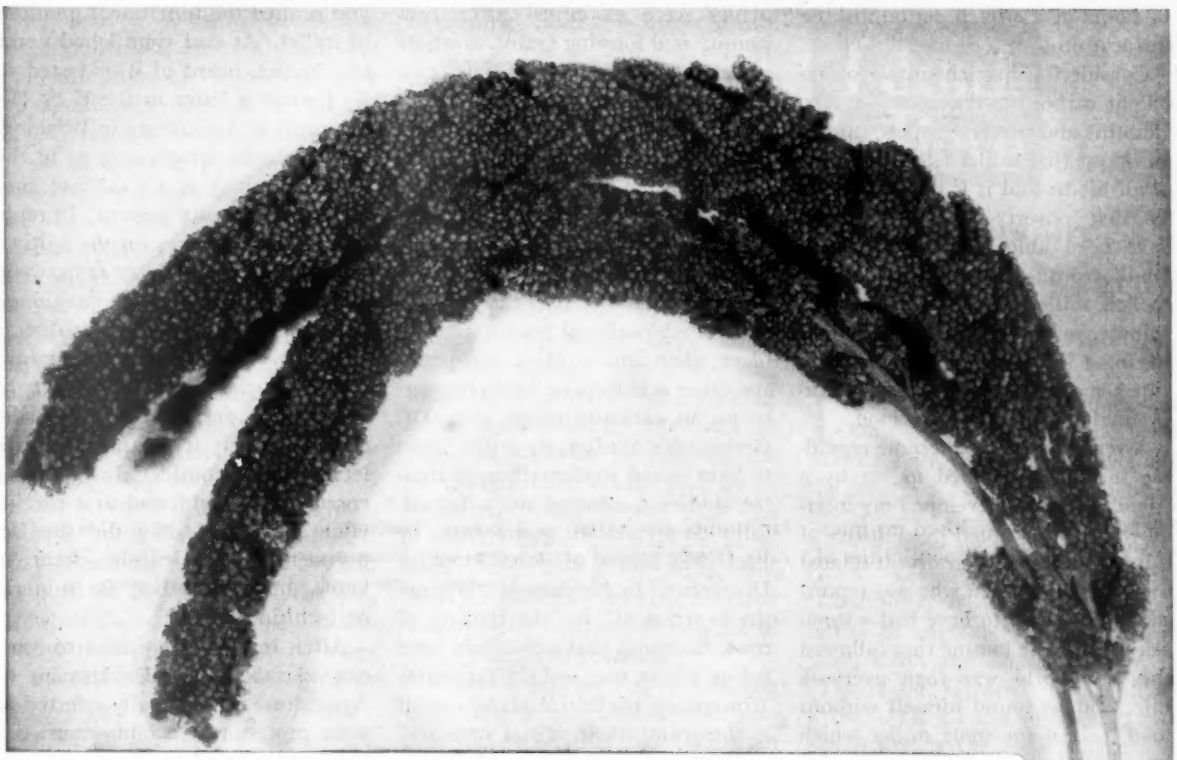


MILLET as a Human Food

By W. R. RAYMOND, Ph.D.

MILLET, or grain sorghum (*sorghum vulgare*), produces small, round seeds which bear resemblance to corn in chemical composition, both being richer in fat than most other grains, the fat content of millet being 3.5 per cent. It is also richer in protein, of which it contains 9.0 per cent. Since corn germ has recently been found to contain all the essential amino acids of meat, soy beans and other complete proteins, we may assume that the same should be true of millet. That this is so, is indicated by the experiments of Qsborne and Mendel of Yale University, who found that millet, when served as an exclusive food, is able to supply all essential amino acids necessary for normal growth and maintenance, which would indicate that it contains a protein of high biological value.

The grain sorghums comprise three varieties: the *Dwarf* and *White Milo* (to which milo maize belongs), which is the best variety for grain; the *Kafirs,* a sorghum with a more juicy stem, which is better adapted for forage purposes; and the *Kaoliangs,* a sorghum grain which has been used as a human food in India and northern Africa since time immemorial.

The sorghum grains were first introduced into this country in 1874, when they were brought over from Egypt and first planted in California. As they can withstand more drought than other field crops, they did very well in this part of the country. In the Imperial Valley, in Southern California, 150,000 acres of milo maize were cultivated in 1918, yielding on an average a ton an acre.

Grain sorghums, or millets, served as a basic food in southern Egypt for many centuries. In fact, millet is one of the oldest foods of the human race; and was grown as a grain crop since man first commenced to cultivate the earth. Since that time it has constituted a basic food of a considerable percentage of the world's population. At present one-third of the human race living in the Orient uses millet as a daily food. In China millet has been cultivated for at least 5000 years; and in India the consumption of millet is greater than that of wheat. Contrary to popular ideas on the subject, the Japanese, like the Chinese, are millet-eaters as well as rice-eaters. In fact, millet is the basic grain used for food throughout northern China: and the millet-eating northern Chinese are declared to be far superior in stature, physique and health to the rice-eaters of southern China. There is an account of an army of Chinese soldiers that marched for

48 hours at a stretch accomplishing this feat on only a dish of millet.

Considering its rich supply of excellent carbohydrates, proteins, fats, vitamins and minerals, there can be no doubt that millet is the cheapest of all foods: and it is thanks to millet that poverty-stricken Orientals have been able to maintain large families on a mere pittance. When cooked, millet swells to five times its volume, so that a handful of millet, costing a fraction of a cent, can provide a meal for a poor Chinese family unable to afford other food.

A very interesting anecdote regarding millet was related to me by a friend, who first developed my interest in the nutritional possibilities of this much neglected grain. It related to a Russian peasant who was reported by his doctor to have had a stomach ulcer. The famine that followed the first world war then overtook him; and he found himself without food, except for some millet which he had stored in his barn for his chickens. So in place of his customary fare, consisting largely of black rye bread, he lived on millet for six months. At the end of that time, he returned to his physician, who, much to his amazement, reported that his ulcer had completely vanished!

This story brought the following thoughts to my mind. As a student of biochemistry, I knew that black rye bread, like whole wheat bread, was very acid-forming; and I knew that a high state of acidity in the stomach is conductive to ulcer formation. Now since millet seemed to reduce the tendency to the formation of ulcers, I supposed that, unlike whole wheat and whole rye, it counteracted acids rather than formed them. In other words, I believed that millet must be alkaline-forming, rather than acid-forming, as most other grains are.

Dr. Gernhardt, medical director of the Los Angeles Sanitarium, conducted an interesting study on the effect of millet on the acid-base balance of the human body. This study was in his sanitarium on patients whose urines were examined after consuming acid-forming grains, as whole wheat, whole rye, whole oats, etc., when they were found to be quite acid, and after they were put on a millet diet, when they were found to have turned from acid to alkaline. Dr. Gernhardt's observations confirmed my previous suspicion that it was due to the alkaline-forming tendency of millet that the Russian peasant who suffered from a stomach ulcer when eating black rye bread and other acid-forming foods recovered on an exclusive millet diet. Dr. Gernhardt's studies on millet seem to have found confirmation on similar studies conducted on a botanically closely related grain—corn—by Prof. McCollum of John Hopkins University. In his famous "Wisconsin experiment" on the feeding of cows, he found that when they were fed on wheat, oats and similar grains (consuming the entire plant as well as the grain), their urines were acid and they gave birth to weak, sickly and still-born calves. whereas when fed on corn stems, leaves and grain, their urine turned alkaline and they produced normal and healthy calves. It therefore seems that both millet and corn produce a more alkaline effect on the animal and human body than wheat, rye, oats and other acid-forming cereals.

Another interesting effect of a millet diet, which Dr. Gernhardt noted, was that it was strongly laxative, tending to suppress intestinal putrefaction, constipation and autointoxication produced by a previous high protein diet. This must be attributed to the anti-putrefaction action of its carbohydrates and to the fact that while millet contains twice as much cellulose, or vegetable roughage, as wheat, it does not have the irritating effect that wheat bran is known to exercise on the mucous lining of the human intestine, its laxative action being bland and harmless.

I first became interested in millet as a human food about ten years ago, after reading a statement made by the ancient Greek philosopher Pythagoras, who lived 2500 years ago and praised the nutritional qualities of millet. At that time I had never seen millet, heard of it or tasted it. So I wrote a letter to the U. S. Department of Agriculture in Washington to obtain information as to the value of millet as a food and concerning its vitamin content. In reply I received a bulletin on the cultivation of millet as a forage crop, without a single word being mentioned to indicate that it had any value as a human food. Also my question regarding the vitamin content of millet was answered most inadequately, clearly indicating that millet was not considered important enough to be subjected to a careful vitamin analysis. Nor did the Department of Agriculture seem to know much regarding its mineral or lecithin content.

After repeated inquiries to various officials of the Department of Agriculture, I was finally referred to some professor in a midwestern college who seemed to have taken an interest in this much-neglected grain. I wrote him and he told me that he had tried adding millet flour to other flours used in baking cookies and bread, with quite favorable results. But that seemed to be all he knew or could tell me about the nutritional value and possibilities of millet.

People who use millet as a food taught me more about the nutritional value of this grain than did the Department of Agriculture or that professor. In fact, they simply raved about millet and its virtues. Universally, they praised it as being the most easily digested and alkaline of all grains. Those suffering from hyperacidity when eating whole wheat, whole rye and oats found that when they replaced these grains by millet, their acid condition cleared up. Those suffering from gas formation and belching when eating fermented breads, raised by the use of baking powder or yeast, found that when they used millet instead, acid fermentation in the stomach ceased.

Cooked buckwheat groats and millet, prepared as a cereal, are staple

foods among peasants in various parts of Russia, and both bear the common name of "kasha" (a word obviously referring to a cooked cereal, though most commonly applied to buckwheat). For this purpose, hulled *proso* millet is used, as the hull of this variety of millet is too tough to be cooked. The grains are first toasted on a pan, and then added to five times the quantity of boiling water. While it can be successfully cooked in an open pot if sufficient water is added, it is best prepared in a double boiler, or, better, in a Pyrex casserole kept in the oven for about forty minutes. This affords an equal distribution of heat, as in a double boiler, so that there is no tendency for millet to get dry and to burn at the bottom of the pot, as when cooked in an open kettle. Millet thus prepared may be eaten as a cereal, having a delicious flavor resembling an egg pudding. Another way to use it is to put the cooked millet in a cool place, or allow to stand overnight, until it congeals and hardens. It may then be sliced; and the slices, after being dipped in hulled sesame seed, sesame seed meal or virgin sesame oil, may be placed in the oven, or over a griddle, until they become crisp. Prepared in this manner, millet provides an excellent substitute for bread, and free from baking powder and dough conditioners now added to our breads, which are really *chemicals* that no more belong in an Organic Diet than chemical fertilizers belong in an organic garden. Such unleavened "millet bread" will be found to be extremely digestible, non-acid-forming, tasty and alkaline in its effect, as well as being non-fattening and quite laxative. Unlike other grains, as wheat and rye, which require the addition of salt and fat to be palatable, millet seems to contain its own fats and mineral salts that make it tasty even when prepared simply with water. This fact should convince one that millet is a more balanced grain than most others, as well as more healthful.

Some time ago I came across an interesting variety of millet grown chiefly in the western part of this country, which is known as *milo maize*, or Indian millet. The word "Indian" is evidently a misnomer, for while Indian maize is the origin of our corn, Indian millet really came from Egypt, and not from the Indians. A friend of mine told me that once, when he was short of food, he put some of this milo maize in a corn popper and it popped somewhat like hulless pop corn. And while other varieties of millet require hulling before they can be rendered palatable, he reported that he cooked milo maize just as he would any other cereal, and that it cooked quite tender right in its hull, and in not a very long time. Also, he informed me that he fared very well on milo maize in place of other grains and proteins.

Since I was interested in anything pertaining to new foods not in common use, on which I have conducted some twenty years of research, I was naturally curious to try milo maize myself. I cooked it with some sesame seed meal and dehydrated Japanese seaweed, and was amazed at its marvelous taste, its extremely nourishing qualities, and its high digestibility, leaving no acid after-effects as wheat and rye do. While having a slight resemblance to corn in taste (hence its being called "maize", when it is really millet), it bore greater resemblence to cooked buckwheat groats. I found it to provide a most satisfying and healthful, as well as very economical, meal. It seemed to provide much more besides starch—for after eating it, one feels as if one has had a balanced ration of nutritional essentials.

I have previously referred to the experiments of Profs. Osborne and Mendel at Yale on millet. They proved by animal experiments that millet contains a richer store of vitamins and minerals than any other of the cereals. In their experiments, animals were fed exclusively on such grains as whole wheat, with the result that they sooner or later suc-

(*Continued on page* 61)

I don't believe *that*

Cauliflowers are difficult to grow

by Leonard Wickenden

I DON'T believe that cauliflowers are difficult to grow. The belief that they are, is of long standing and the experts are almost unanimous on the subject. As long ago as 1913, Allen French wrote in his "How to Grow Vegetables" (Macmillan): "Cauliflower is difficult to grow; a fastidious vegetable." Thirty years later, Edna and Laurence Blair, in "The Food Garden" (Macmillan) wrote: "Of all the cabbage group, cauliflower is the most difficult to grow." And as recently as January of this year, the Editor-in-Chief of *The Home Garden* characterized the cauliflower as "among the difficult vegetables."

Perhaps I shall meet my Waterloo this year, but I haven't done so yet. The variety I favor is Snowball and I grow it as a fall crop. The heads are large and handsome, but I cannot take much credit for that; they grow that way themselves. I use no special tricks for the simple reason that I don't know any. According to the books, cauliflowers are so sensitive to drought that any prolonged shortage of rain is inevitably fatal. In our part of Connecticut last summer we had a seven weeks drought, starting late in August. I did not dare to water very much for fear our well would run dry, and what little water I used was carried in watering cans, so according to all the rules of the game my cauliflowers should have been ruined. Out of twenty plants, I obtained nineteen large perfect heads; the twentieth never produced a head at all, not so much as a button. Where the head should have been

(*Continued on page* 62)

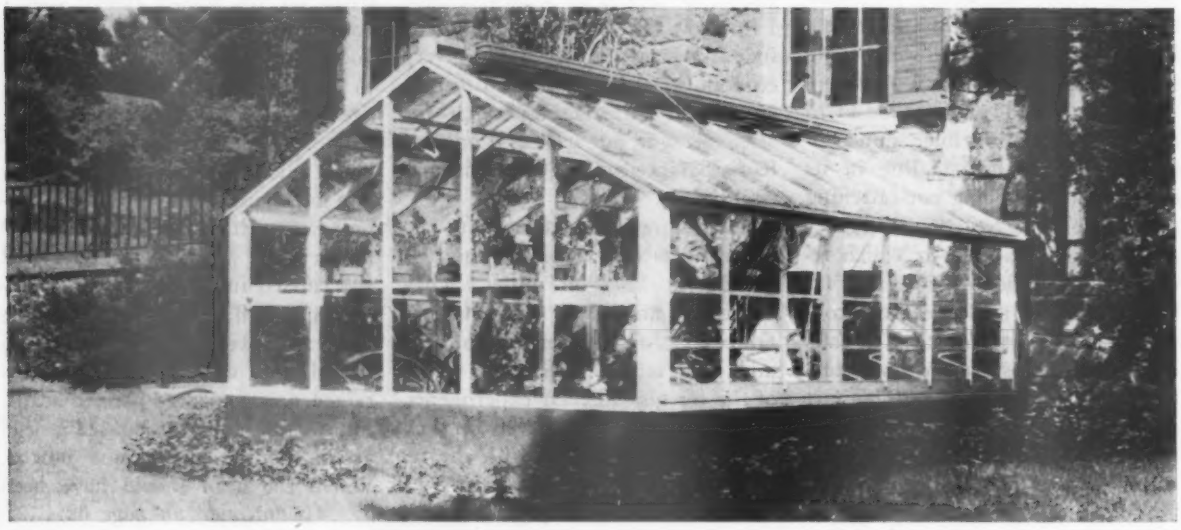
Home Greenhouses are Inexpensive

by ERNEST CHABOT

TIME was, and not so long ago, that a greenhouse was an expensive luxury that only the wealthy could afford. This is no longer so. New designs, modern materials and equipment have brought the greenhouse costs down to a fraction of what they formerly were. Now for no more than the price of a second-hand automobile, you can get prefabricated parts to put up a good-looking, practical glass house, or if you are especially adept at carpentry, you can get the individual glazing bars and fittings and build one yourself for even less.

Prefabricated greenhouses are usually about 9, 10 and 13 ft. wide. Lengths are in sash sections or about 2½ ft., so you can build the greenhouses any length you choose. They come with slanted or straight sides like those pictured. These greenhouses are made in sash panels that any handyman can put together with a screw driver, wrench and hammer. All the parts are furnished cut to fit in place. The glass is cut to size and is not putty glazed. It goes into glass grooves in the sash and is held weather-tight with a special caulking rope.

While the prices for the materials for a prefabricated greenhouse are higher than purchasing parts such as glazing bars, sills, eaves, ridge and fittings of a conventional type greenhouse, the time they save in labor greatly offsets the difference. The building of such a greenhouse should never be attempted by an amateur for it takes skill in carpentry and glazing to do a good job. The sills, eave plates and ridge must be perfectly parallel with the glazing bars, accurately spaced and exactly perpendicular to them. Glass has square corners and will not fit into the openings unless all work is square. Should the work be out of line, it would be necessary to cut every single light of glass to make it fit. Many home gardeners who are skilled with tools, however, are able to do a good job of building a greenhouse from such parts. Another word of caution might be in order here. It never pays to try to make your own greenhouse materials from wood purchased at a local lumber yard. The



parts furnished by greenhouse manufacturers are not expensive in comparison. The members are shaped just right to carry off surface water and condensation. They are made of the right kind of wood to stand up under the conditions of moisture and heat to which a greenhouse is subjected. They will last for many years while those of ordinary lumber are sure to rot away.

Greenhouse Walls

No doubt the walls below the sills are the hardest part of building any greenhouse. Masonry walls are best because they are more permanent than those of wood. Poured concrete, brick, cut stone, or cinder blocks are used. Cinder blocks provide the easiest means of building a wall. But since they leave an unsightly finish, the outside should always be coated with stucco and painted. The attractiveness of a greenhouse depends a great deal upon its walls, for this is the largest solid area that you see. If you are not particularly adept at handling masonry, it is probably best to hire someone locally to build them for you. The walls of a prefabricated greenhouse should extend below frost. This would be about 2½ ft. in most areas but may be less in the southern states and more in the north. The footings below the ground can be of poured concrete, and gravel. A conventional type greenhouse is built with steel posts set on footings and encased in piers that extend below grade. The side walls need only go down to solid ground, a few inches below the grade.

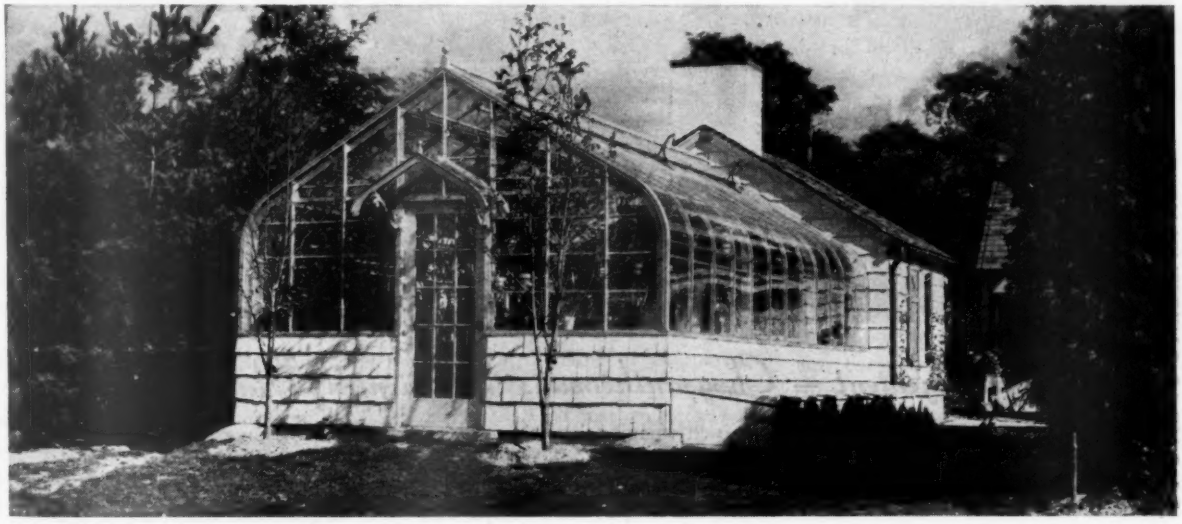
Location

It is important to locate the greenhouse where it will receive a maximum amount of sunlight particularly during the days of December and January when every bit of sunshine is important, especially that of the morning sun. After 3 P.M., it is not so serious. In the north, above the Mason-Dixon Line, the recommended direction to run the greenhouse is on a line 10 degrees N.E. and S.W. of east and west on the compass. Farther south, this is not important, in fact, many greenhouses that are built in other directions are giving excellent results.

A Word About Size

Never build a greenhouse too small, even to start with. I have heard many people say, "I would love to have a little greenhouse 4 x 6 ft." This is not practical. In such a small area, it is impossible to maintain an even temperature and a healthy atmospheric condition. On sunny days, even in the winter, the temperature in such a greenhouse would run over 100 degrees in a matter of a few minutes. Then at night when the sun goes down, it would cool off just as rapidly. Plants will not grow under such conditions. The smallest of greenhouses should never

(*Continued on page* 55)



PHOTO—BOUTRELLE

Flower Arrangement — Chrysanthemums in Oriental Manner

Quoting judges—New York Horticultural Society, Shown at Essex House, New York

Arrangement by—Mr. Everett W. Feucht, Brooklyn, New York

"Much imagination, thought, and work must have gone into this with excellent results."

"It is refreshing to see a new interpretation of an ancient theme."

"Beautiful line, color—white and tones of grey, and interplay of texture. The background is most interesting—great originality shown in composition."

The New Organic Method

By J. I. RODALE

SOME INTERESTING FACTS

I AM going to start off this department with an extract from a letter which J. M. Moubray, of Chipoli, Southern Rhodesia sent to Lady Eve Balfour and printed in *Mother Earth,* journal of the Soil Association in England, (Autumn 1949). It was entitled:

SHOULD COMPOST-MAKING BE COMPLETED IN THE SOIL?

I have been thinking of some of the things you say in the Spring number, on pages 32, 33, and 34, for some time. We used to rot all our compost down to a high concentration. This may be best for pot culture and hothouse work and so on; but when you come to field work, I am not sure that the last stages of decomposition should not take place in or on the soil, and that the heaps should not be moved before the final stage is reached. If you turn back a heavy grass mulch where that portion in contact with the soil has already started to rot down, you will find that some of the feeder roots have come to the surface and come out of the soil. I am speaking at the moment in particular of a field of tomatoes.

The conditions here seem ideal for the working of the aerobic, nitrogen-fixing bacteria: *azotobacter.* Now what have these roots left their natural element for? There must be something to attract them in this new zone above the surface. Is it the humus being formed, or the nitrogen being fixed in it, or something else, or a combination of them all?

Obviously the mulch is functioning in some way other than simply to conserve moisture, which was the original idea when we started mulching. I have no experience of adding a separate, highly-concentrated activator of humus. I do not think that under our condition anything would be gained from doing so. When we supply her with the requisite material, Nature seems to work as fast as is possible.

I have in the past made large quantities of charcoal, and when this had been screened for use in the suction-gas plant a good deal of fines were left. This we have put on beds, but we could not detect any difference between the crops grown with and without charcoal. With us, earthworms do not come into the picture; they are only to be found under old compost heaps or in damp soil along the streams. We only use the primitive method of making charcoal; the wood is stacked in the usual way, then covered with coarse grass and that with soil. When the charcoal has been taken away, the natives plant pumpkins on the sites of the kilns and get very fine crops; but I think that is partly due to the wood ash, a certain amount of which is always mixed with the refuse. I could, if you think it would be any use, do some tub experiments for you. I have some vermiculite, which is simply a sponge, whereas charcoal is claimed, besides being a sponge, to have other properties. I would suggest:

(1) Concentrated humus (compost) and charcoal; (2) concentrated humus and vermiculite; (3) concentrated humus alone; (4) partly rotted humus (compost); (5) plain soil (control); (6) plain soil and charcoal.

I should grow corn, as it grows quickly and soon shows results.

I sent you photos of my tub experiments of the effect of interplanted legumes with corn (MOTHER EARTH, Summer, 1948). These, to me, proved beyond doubt that the legumes, practically from birth, excreted amino acids which were taken up by the corn. It is in such tubs that I would do the suggested experiments.

I am frequently being sent literature containing so-called new or better methods for making compost, but after making many thousands of tons by Sir Albert Howard's methods, with local modifications, I find it is still the best and, to me, the only method.

(Note. By Editor of MOTHER EARTH —*Capt. Moubray's suggestion that compost might best be used before it is fully mature appears to have special application to African conditions. Thus, the Rhodesia* Agricultural Journal *for December* 1946 *contained a report that at the Hillside Plant Breeding Station, partially-rotted compost had given better results than well-rotted compost for two seasons running, when applied to irrigated wheat* (*quoted* MOTHER EARTH, *Harvest* 1947). *Again, the leaflet issued by the South African Department of Agriculture on 'The Preparation and Use of Compost'* (*Reprint No.* 42) *says that 'the general opinion is that compost should be applied and ploughed under before it is quite ripe'* (*quoted* MOTHER EARTH, *Spring* 1949). *This advice is repeated in an article in* Farming in South Africa, *April* 1949).

Originally Moubray found that making compost until it was entirely broken down was a good method. Now he discovers that permitting it to finish out in the soil was better. Moubray who is a reader of *Organic Gardening* will no doubt now begin to experiment with the new method of applying *all* the organic matter to the soil direct and letting the entire composting process take place there. His findings will be interesting.

TURNER'S LETTER

F. Newman Turner, of the Institute of Organic Husbandry, of Eng-

land after seeing a short account of the new organic method wrote me as follows:

31st October 1949

Dear Mr. Rodale,

I have now been able to consider your letter of September 19th, and the proof of your editorial for October.

There are no short cuts in nature, a view which I know Sir Albert Howard held strongly. Our aim is not so much to simplify manuring as to achieve the abundance and health of nature. We therefore follow as closely as possible the methods of nature though often we may in our indolence, and arrogance, be tempted to short circuit her.

Nature's process starts with aerobic decomposition, followed by a short anaerobic period. The finished product, as in the forest floor of nature, is adequate to assure abundant production and perfect health. The reason for this is to be found not only in the content of nitrogen, phosphates and potash, but in the far more important vital ingredients which are incapable of measurement by chemical analysis.

I place no great importance on mere N.P.K. analysis which, at least as far as health and quality (the real criteria of organic success) are concerned, are not of great importance.

So called loss by oxidation from the aerobic compost heap is not a permanent loss, if we regard the processes of nature as an organic whole. For what goes off the heap into the air is later recovered by the bacteria of the compost and the soil, and subsequently the leaves of growing plants by photosynthesis.

Liquid losses are considerable from the ordinary farmyard manure heap —but there should be no such loss from a properly made compost heap.

So much for Selvi, whose theories I certainly cannot accept as a part of the organic method.

But Dr. Dahr's findings are thoroughly sound. We have practised them for nearly seven years on this farm with great success. All our organic matter has been kept on the surface during these years and this surface sheet composting has been used with all kinds of organic matter, singly and in combination, with and without the additional employment of green crops, especially weeds. By this method, organic matter may be applied to the soil in any form, from raw greenstuff to ripe compost and if kept on the surface, incorporated with the top soil, will decay slowly, releasing plant nutrients over a long period of time, and, with the organic acids of decay, make available the minerals which are otherwise present only in an insoluble form. It is thus generally unnecessary to import even ground rock, to soil which can have ample organic surface dressings.

There is no doubt that Dr. Dahr is right in line with natural law, but I cannot feel so confident about Selvi.

Yours sincerely,
F. Newman Turner

Mr. Turner states that there are no short cuts in nature. Surely the placing of a thinner layer of organic matter over the soil is a practise closer to nature than heaping the material five feet high. Mr. Turner does not seem to be in favor of the Italian enclosed method of making compost. Unfortunately he did not see the booklet written by Mr. Selvi which was printed in the December, 1949 issue of *Organic Gardening*. If he did he might have been a little more favorably disposed towards it. In our practice of the new organic method we do not intend to make much compost. What little we do, under emergency conditions, when we cannot find a place to put our raw organic matter directly into the soil, will be by the Selvi method.

I admit that liquid losses are greater when there is much manure present ir the heap, or all manure. A compost heap made of all green-matter and using earthworms, loses less, but if it stays out over a long period, it should be protected from the rains, for that will wash through the heap, taking much liquid essence with it. However, there are certain benefits to the soil from mulching the materials on it, which cannot be obtained in composting. For example, after the growing season was over we laid down a heavy mulch over the soil containing all the ingredients we would have used in making compost. The powdery stuff such as the lime, phosphate rock and bone-meal we first put directly on the soil, covering it with the green matter and some manure. Now over the winter it is keeping the temperature of the soil higher, protecting bacteria, fungi and earthworms. This, I am sure, will be an extremely potent factor in making the new method a success.

GUTTFELD'S LETTER

I have been maintaining an interesting contact with Mr. Sch. P. Guttfeld of Palestine, who has been appointed a government officer by the Israeli Dept. of Agriculture, to spread the organic idea in Palestine. He also read only the one article in the October issue of the *Organic Farmer* and has not yet seen the December issue of *Organic Gardening* in which I protected my new position by giving so much other data. Here is part of his letter:

Concerning the sheet composting, I wish that you had not recommended it so generally. The compost heap is a very clever attempt to repair the damage which the farmer causes to the natural conditions for the decaying of organic wastes in the field, the forest, and the pasture. The decaying conditions on the field are in several climates and soils very unfavorable for the formation of humus, and the decomposition products in those fields are by no means equal to the humus in properly made compost. Particularly not with regard to their lasting effect.

The research of Mr. N. R. Dhar I always thought as very important, but we would be wrong if we would generalize his finding. It is not right to accept his findings for other climates without any special research, and to overstress them at the cost of the general biological processes and the care for their conditions. It seems to me that the importance

of the biological processes is far greater than the fixation of Nitrogen through the sterile oxidation of organic matter. For example, I think that in areas with restricted amounts of rain, it is not desirable to supply half-digested manures.

I hope that you will return to your former conception of care for soil fertility after the revolution. The mechanization of composting and spreading should allow the farmer to manure at acceptable costs with properly made composts. That is the main road.

Very sincerely,
Sch. P. Guttfeld

In answer I want to admit at once that under conditions of hot, arid climates, the new method must be studied carefully. However, it was in the hot climate of India where Professor N. R. Dhar's experiments showed that the discing in of a thin layer of raw organic matter resulted in a great increase of the nitrogen fixation. It was not one experiment but hundreds, and the results were always the same. In hot climates, no doubt, the mulch material should be mixed in the upper three or four inches of soil, and not permitted to lie above the soil as a mulch as it would dry out and burn too much. The application of irrigation waters would be recommended if available.

Dr. Dhar is at present studying his researches as pertaining to our Pennsylvania climate and in four or five months something should be forthcoming from that source. My experiences with mulching in our climate, extending over a period of eight years has shown that it is an extremely safe way to handle organic matter. This has been confirmed by the experience of hundreds of our readers. We are not going away entirely from making compost. We will keep our hands in it. There will be many growing experiments made with the various methods in 1950 and by the end of that season much data will be available from which to judge. I think it was a good thing to notify all our readers immediately about this change so that they could be part of this breath-taking experiment.

THE ACHARYA METHOD IN INDIA

Here is a bulletin issued by the Government of India Information Services of Washington, D. C. which has a little data about an anaerobic type of composting:

INDIAN COMPOST MORE PRODUCTIVE THAN CHEMICAL FERTILIZER

"Indian compost manure produced from town wastes, mostly night soil, has been proven to yield greater results than chemical fertilizers.

"Compost has been produced both in America and Britain but the Indian method (called "hot" fermentation), developed by Dr. C. N. Acharya, a biochemist in the Department of Agriculture, Government of India, produces the highest quantities of manure and loses minimum carbon and nitrogen, essential for a fertilizer. Approximately 250 of 700 large Indian municipalities are now engaged in the task of producing compost manure. The total output last year was estimated to be 1,150,000 tons.

"The Indian method is under study by the officials of the U. S. Department of Agriculture for its applicability to America. Under it, compost material (consisting of night soil, fallen leaves and other town wastes), is kept aerobic for a preliminary period of five to six days during which time there is rapid decomposition and rise of temperature to 65°-70°C. At the end of this period, the mass is covered over with a layer of mud paste and over it earth and kept closed for about 2½ to 3 months, to allow anaerobic rotting to take place. The manure is then ready for application to land."

I have been in correspondence with Dr. Acharya who was a friend of Sir Albert Howard. Here is a case where compostable materials for 2½ to 3 months is permitted to rot without air, *a la* Selvi. Acharya was a disciple of Sir Albert Howard.

QUESTIONS AND ANSWERS

Question: I have enjoyed immensely the December issue and the new worlds to conquer that you have presented. You are unquestionably on your way to eventual revolutionary changes in both the health and husbandry of the nation. Keep up the good work.

One or two questions, as I am an ardent practitioner of the organic method with apparently almost spectacular results. Can the new enzactivator be used instead of the usual activators that we have been using? I refer to the trade preparations on the market, which are all right.

Do you believe enzactivator can be used to break down the vegetable green matter (plus the rock phosphate and lime) as successfully as the present trade activators on the market? (I know they are your advertisers and I mean no ill towards them as I know from experience that their products are excellent.)

Answer: I believe there is a difference between the enzactivator and bacterial activator such as Activo and BCA. The first is an enzyme product, the second contains bacteria which excrete enzymes. The new enzactivator is an experimental item regarding which little is as yet known. I was very fortunate in being able to make contact with Kazuyoshi Yamaji of Tokyo through General Douglas MacArthur's office. Yamaji is the patentor of this process and has written me that he is preparing an article for us which will give additional data about his process. In my opinion the efficiency of each item would be enhanced if it was mixed with the other. We therefore recommend that a bacteria activator if mixed with the enzactivator will make the action of the latter much more effective.

I believe that an important use for the bacteria type of activator will be as a mix with mulches laid down according to the new method. It will make it decay much better.

Question: Can the Selvi enclosed manure pit be used to break down

the green matter with a biological activator instead of fresh manure? Or, can it be used to carry out the break down of our conventional method of a layer of green matter, a layer of fresh manure and lime and rock phosphate?

Answer: Mr. Selvi used his method only with manure. As shown by a photograph in our January issue, we have construced a small pit by this enclosed principle and are trying to break down straight green matter in it. We are using alfalfa hay. In one pit we placed the hay without chopping up, in the other we ground the hay. By spring we will see what happens. Grinding green matter, or garbage, is known to accelerate the decay process considerably.

Now, I am sure that using some kind of activator would hasten this break-down. Eventually a special bacterial activator should be placed on the market in which the bacteria are selected to thrive under these enclosed (semi-anaerobic) conditions.

EARTHWORMS

I have always noticed that in making compost when earthworms are inserted they throw their castings on the top of the heap, so that when a mulch of compostable materials is placed on the soil and earthworms placed under it, they will enrich the mulch with their highly valuable manure.

SEEDS AS FERTILIZER

If you wish to use a ground up seed such as soybeans or wheat as a fertilizer, it would be good to let it ferment first for about a month. Saturate it with water, so that it does not become too soggy, and cover with a cloth so it does not dry. Apply to the soil at least a month before planting time. Dig it into the upper three inches.

COMPOST HEAPS

If you insist on making compost heaps, or have to do it for a special purpose, make them right over your

(*Continued on page* 57)

Root Systems of Vegetables

(A Series)

SWISS CHARD

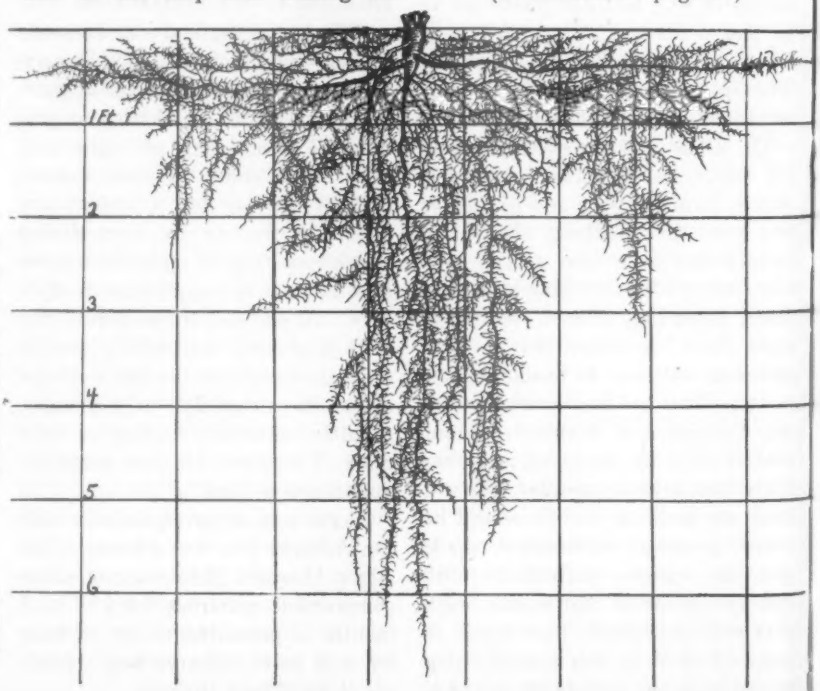
by DR. PAUL SCOTT

THE root system of Swiss chard is characterized by a strong taproot and many strong lateral branches, all of which originate in the first foot of soil. It makes a vigorous growth and early in June occupies a conical mass of soil 5 feet in diameter and 3.5 feet deep. Mature taproots are 2 inches thick, but taper rapidly, and penetrate to depths of 6 to 7 feet. The strong, widely spreading, horizontal branches, with their long and profusely rebranched laterals, thoroughly occupy the soil from near its surface to a depth of 2 feet and throughout a radius of 3.5 feet from the plant. Almost vertically descending laterals, paralleling the course of the taproot, and like it, well clothed with branches, ramify a soil volume about 18 inches wide to a depth of 6 feet. Thus the root is well fitted for absorption both in the surface and in the deep soil. During the second year the plant increases its absorbing surface by a dense growth of rootlets on the older portion of the root system. This is further augmented by the renewed growth of many of the finer rootlets already formed on both surface and deeper portions of the root system.

Root Development in Relation to Cultural Practice.—The vigorous development of the very extensive root system and perhaps its ability to adapt itself, like the sugar beet, to different environments, may account for the fact that chard is not as exacting in soil requirements as most other vegetable crops. It is a hardy, vigorous plant, and with a little protection will live through the winter. Any good garden soil is satisfactory for this easily grown plant.

It would seem that in growing chard, as well as most deeply rooting

(*Continued on page* 56)



Miscellany . . . . . .

A MISSION from India that came to the United States recently to study chemical fertilizer factories in the U. S. with a view of building similar plants in India, made our organic farm one of their points of interest. The head engineer was extremely impressed. It is sad, that the country that gave us the Indore method of making compost developed by Sir Albert Howard while in India, the country that is behind Professor Dhar of Allahabad University, who recently gave us the inspiration to improve that method, a country which uses practically no artificial fertilizers, now is to start its manufacture on a more extensive scale.

When we showed him how practical was the organic method, from the point of view not only of increased health but that of higher yields and asked him why they would be thinking of going into the manufacture of chemical fertilizers at this late point when the pendulum was beginning to swing the other way, his answer was that all the world was looking towards the United States as their model.

"We in India admire everything you do in the United States. You are setting the example for us with your big chemical fertilizer industry. We are inspired by you", he said.

However, I am sure that I gave this movement in India a severe jolt. I explained to him that India has tremendous deposits of rocks of all kinds of mineral analyses—millions of billions of tons of it. All they needed was to import some crushing machinery so as to be able to make fine powders of it. That would be far cheaper, far safer and a far more effective type of mineral fertilizer than the concentrated and acid types. His eyes gleamed and he answered: "We have the crushing machinery in India." He took out a little black pocket blank-book and wrote in it "Investigate rocks".

Those two words may have a tremendous significance for India. The decision that India makes on the return of this gentleman to his country will mean billions of dollars, one way or the other, depending upon the decision that is made.

ANOTHER INDIAN

Here is an item that speaks for itself. It is from a "Rod and Gun" department of some newspaper whose name was not given by the reader who sent it in. The author is Henry Moore:

"Nobody knows how many million words have been written to describe America's profligate waste of every natural resource from good fishing water to household fuel, but the Massachusetts Fish and Game Association this week uncovered a Cherokee Indian from Oklahoma who has set down the whole picture in less than 100 words.

"To show the destruction wrought by soil erosion an Oklahoma farm paper printed pictures of a badly rundown farm house on its setting of gully-washed fields, and offered prizes for the best essays based on the pictures.

"The Indian was a hands-down winner with the following efforts:

" 'Both pictures show white man crazy. White man make big tepee. Plow hill. Water wash. Wind blow soil. Grass all gone. Squaw gone. Papoose gone. No chuck-away. No pig. No hay. No cow. No pony.

" 'Indian no plow land. Keep grass. Buffalo eat grass. Indian eat buffalo. Hide make tepee, mocassins too. Indian no make terraces. No build dam. No give damn. All time eat. No hunt job. No hitchhike. No ask relief.

" 'Great Spirit make grass. Indian no waste anything. White man much crazy.' "

The Indians both of the East and the West, if left to themselves, will farm in a manner that will preserve the soil and their own bodies. Witness the Navajos in this country with the lowest cancer rate of any other group.

EARTH ABIDES

Earth Abides is a novel written by George R. Stewart and just published by Random House, in which practically all of civilization is destroyed by an "unknown disease of unparalleled rapidity of spread and fatality". Only a few survivors are left and the story is about them. One of them is a geographer by profession which gives the author an opportunity to give the book a light scientific touch. Mr. Stewart, the author, has the unusual distinction of having previously written a novel called "Storm" in which the storm itself was a character in the book, almost the hero, the way Stewart built him up.

Now, Mr. Stewart, if you will look into the organic method of farming and nutrition and see how close it comes to your idea in that some day the continuing use of chemical fertilizers may bring about a new disease that might destroy civilization, perhaps you might make it the theme for another novel.

His current book *Earth Abides* will be highly enjoyed by the typical organic gardener.

CHEMICALS ARE COSTLY

Here is an item from the Miami Daily News of Sept. 7, 1949:

BABY DIES, WEED KILLER BLAMED

"Keith A. Deal, Jr., 15-month-old Hialeah boy, died at a doctor's office today after swallowing, his parents suspect, weed killer. Keith's mother said the boy became nauseated soon after she put him in his crib for a nap. She rushed the stricken child to the office of a doctor where he was pronounced dead. An autopsy will be made."

Here is another clipping which shows the repercussions of using poi-

son sprays. It is from the Grand Rapids Press of Nov. 9, 1949:

MERCHANT SUED
IN CROP FAILURE

"A $3,500 damage suit has been started in circuit court by Nick Meyer of Grandville against John Groen, individually, and doing business as William Groen & Son Hardware, 1600 Grandville-Ave., SW.

"Meyer, a celery grower with a farm near Kent City, alleges his celery crop was destroyed this summer after he sprayed it with a disinfectant sold to him by Groen."

They are still experimenting! Opponents of the organic method criticize us, saying we are not scientific. The whole chemical fertilizer and poison spray concept has been put into use without the slightest scientific experimental attempt to study their effect on human bodies that take in food produced in such manner.

AIRPLANE SPRAYING

The entire country seems to be mobilizing every possible airplane for use in air spraying of poisons on a huge scale, spraying both the wicked and the virtuous. This is enough to make any organiculturist hopping mad. Where is that vaunted traditionally rugged individualistic liberty we brag about to the world? A neighbor of ours sprayed a field with a weed killer and some of the fumes came over to our farm. A prize grape-vine, I am sure was affected. This year the grapes were small and not as healthy as we have enjoyed in previous seasons. It may be due to some other condition. I will not swear, but it looks suspicious.

MORE POISONS

We are living in a chemical, poison age and it is going to eventually reach farther than we bargain for. The following is an Associated Press item of Aug. 31, 1949:

65 DEER VICTIMS
OF STRANGE MALADY

"TUSCALOOSA, Ala.,—At least 65 deer have died in Alabama forests, victims of a strange malady, possibly poison. Persons close to the deer situation believe probably twice that number have died but bodies have not been found. The strange situation developed about six weeks ago and reports of additional deaths are accumulating.

"Stomachs of three deer victims are being examined by Dr. D. S. Folse, of the department of pathology, Auburn's school of veterinary medicine. Dr. Folse was quoted as saying tests now being made will be completed in several days.

* * *

"DR. FOLSE SAID no evidence of 'black leg' organism was found. 'Black leg' is a disease which afflicts cattle.

"Several deer were found dead in Oakmulgee National Forest, near Moundville; seven on property near Geiger, in Sumter County; four on a farm near Aliceville and several others also in Pickens County. One ailing deer found in Northern Tuscaloosa County was brought to a Tuscaloosa veterinarian but the animal soon died.

"Some local observers conjectured that some poison mixtures used in fighting boll weevils in cotton might have caused the deer deaths. There was no evidence, however, of such deaths among livestock on farms in this area."

The reader of *Organic Gardening* who sent me the clipping added this note: "Some visitors just through here by car, sick on arrival from air-laden poison from spraying cotton in this section". How brave those spraying mortals be!

This deer dying by strange deaths is spreading. More than 200 carcasses were found near Aberdeen, Maryland, 200 in Kentucky and more than 100 in West Virginia. There are substantial numbers in North Carolina and other states. Here is what the N. Y. Herald Tribune (Sept. 29,1949) said in part about it:

"Dr. Logan J. Bennett, chief of the wild life research branch, said he understood parts of Georgia also were affected., State university and experimental station pathologists are working on the problem with the help of game wardens in the areas already hit, and liaison is being maintained with them by the Interior Department's wildlife experts.

"Because of the epidemic's possible implications for domestic animals, the Agricultural Department's Bureau of Animal Industry also is interested in its cause as well as its progress. Dr. L. T. Giltner, assistant chief of the bureau's pathological division, said analytical autopsies are being made on two deer carcasses sent in yesterday from the Aberdeen area.

"Dr. Nelson said there has been 'lots of speculation' concerning the deer epidemic, including the possibility that it was due to the widespread use of DDT or other poisonous insecticides and fungicides in orchards where the animals frequently graze at night as a result of 'overpopulation' in their wild forage areas. He added, however, that, up to now, there were no known deer or other big game casualties from this source although birds and other small game suffered heavily from this type of poisoning in some localities."

What else could it be but some kind of poisonous insecticide or weed-killer?

D.D.T.

Here is an item of interest:

DDT MAY HARM
GARDENS—EXPERT

"MINNEAPOLIS, Aug. 25. (UP) —DDT may have a harmful effect on soils, a garden specialist warned.

"Dr. R. M. Carleton, research director of Vaughan's Seed Co., Chicago, told the convention of Men's Garden Clubs of America that some studies indicate use of the insecticide may cut soil fertility after five years.

"He warned gardeners to be cautious in the use of DDT until further studies have been made on possible soil poisoning."

GRAPES

Why don't more people grow grape vines on porches as an orna-

(*Continued on page* 58)

1. Make furrows with a plow.

2. Cover each tuber with a shovelful of compost.

REPORT ON POTATOES

by ALDEN STAHR

IN a spring issue of *Organic Gardening*, the mulch method of growing potatoes was suggested and reports from readers were requested. Here is our experience with this method.

Last summer, for the first time, we raised our own potatoes in our garden, only because the compost and mulch method suggested an easy way to raise them. We had *started* potatoes before but never *raised* any except for the bugs. Also, what deterred us in previous years was the thought of all the cultivating and dusting usually associated with raising potatoes, but we discovered that neither is necessary.

In April we prepared a patch of garden by turning under the winter rye we usually grow to enrich the soil, and then we waited long enough for this to decompose before planting. We next made furrows with a walking plow, stuck a whole potato in the furrow every six inches (cutting weakens the plants), and put a shovelful of compost over each potato before covering with soil. No lime was used in this particular compost since potatoes thrive best in a slightly acid condition. After covering the potatoes with the earth turned up at the side of the furrow we spread a foot of spoiled hay over the whole patch. *That's all the work we did on potatoes until time to dig them up.*

The potato plants pushed up through the hay, but the weeds did not. Soon the plants were profuse and dark green and kept growing and flowering throughout the worst drought in history in our locality. At no time did we spray. After forty days of drought, potato bugs ate off many of the leaves, but when it rained, new leaves came out and these were not attacked. We noticed this same curious condition with our lima beans. When the plants had no water for over a month they became unhealthy because of this lack, but when they got a drink they regained

(*Continued on page* 59)

3. Then mulch with a foot of hay.

4. Drought resistant, insect and disease-free plants.

SPRING PROBLEM

THE seed catalogues are with us again and once more the home gardener must face the bewildering job of deciding not only what vegetables he shall grow but what variety of each he shall choose. All the more popular vegetables are offered under many different named varieties and on each is bestowed such fulsome praise that strength of mind is needed to resist the temptation to order the lot and forget the expense. To succumb, however, leads only to quantities of left-over seeds at the season's end or, far worse, to an overcrowded garden.

The situation is made more difficult by the practice of some competing seedhouses of offering the same seeds under a variety of names. The gardener, picking his lettuce seeds, may order Fabel's Fantastic from one catalogue, Storey's Stupendous from another, Tayle's Terrific from a third and Fixion's Fabulous from a fourth, only to discover, when all four have come to maturity, that it is impossible to distinguish them from the variety he has been buying for years under the name of Early Light Green. I sometimes wonder if it would not simplify life for the seedmen, as it certainly would for the gardener, if they would all get together once a year, hold an election for the six best varieties of each vegetable, agree on the names and then complete for customers on a basis of service, quality of seed and price.

As that day has not arrived and shows no signs of doing so, the problem of selecting remains. One guide to a reliable variety is to find out how many rival catalogues list it. Any variety that has proved its merit so conclusively that three out of four leading seedhouses include it in their price-lists may be purchased with confidence.

I have tried to help my fellow gardeners by compiling a list of varieties which I have found, by experience, to be superior, or which have come to be recognized by seedsmen and gardeners alike as possessing special merit. Some of my suggestions will, I am sure, be greeted with disapproval; more of my omissions will, no doubt, arouse indignation, for every good gardener has his pet varieties. Let me say, then, that the varieties named below are not put forward as beyond question the best; they are merely those which have given me satisfaction or which are favorites among my gardening friends. For myself, curiosity always prompts me to try some of the new varieties offered so alluringly year by year, but most of my money goes for the old reliables.

I have, on my desk, the 1949 catalogues of four seedhouses—all long-established and of high reputation. With them for reference, my choices are given below:

Bush Beans. With this vegetable, you can scarcely go wrong. I have

By **LEONARD WICKENDEN**

Picking the Winners

grown many different varieties in my time and every one of them gave a good crop of beans which were not merely edible but of high quality. Longreen is listed by all four of my catalogues, Tendergreen by three. Bountiful (four listings) is liked by many because of its flat pods which are good for "Frenching"—i.e. shredding lengthwise. For the first time, I tried Streamliner this season and it will now be among my regulars; I found it prolific, handsome, tender and of good flavor. I also tried Rival; it was good but not, I thought, outstanding. Of the yellow beans, I like Golden Bountiful—also known as Surecrop Wax.

Bush Limas. There are two varieties of bush limas—small and large. Limas stand high on the list of choice vegetables—I have met people who put them at the top—but they are exasperatingly difficult to get out of the pod. After long wrestling, I like to be rewarded with a big, fat bean, so I grow only the large kind. For best flavor, I choose Fordhook 242, but for earliness, yield and long season, Early Giant wins out.

Pole Beans. Kentucky Wonder for string beans and King of the Garden or Empire State for limas.

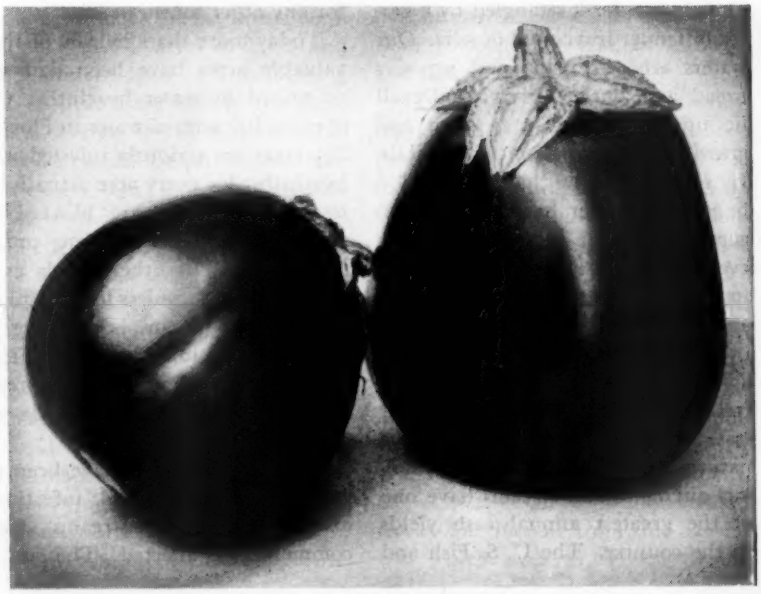
Beets. Detroit Dark Red is listed in all four catalogues; it has been a standard. For winter use, I strongly recommend Winter Keeper – also known as Long Dark Blood and as Lutz Greenleaf. It grows very large but remains tender and sweet right through winter storage.

Broccoli. You will find this vegetable listed under many different names but when grown it is difficult to find much difference between one "variety" and another. All that I have tried are good and no home garden should be without this excellent productive vegetable. De Cicco seems to be popular and so is Calabrese and my guess is that you will get one or the other (assuming they are different) if you buy it under the name of Brown's Superverdant or Jones' Beautiful Branching or Robinson's Celestial Flowering.

Brussels Sprouts. Another excellent vegetable, providing fine-flavored greens right up to heavy frost. All four catalogues list Long Island Improved and I can vouch for that variety. Light frosts improve the flavor.

Cabbage. Over this vegetable, the gardener is inclined to throw up his hands. My four catalogues list no less than 21 early cabbages and 10 late. Undoubtedly there are duplications. Golden Acre Resistant gets four listings—it sometimes appears as Resistant Detroit. Another recognized standard is Jersey Wakefield. I have had good luck with Racine Market, which is sometimes recommended for the home gardener having limited space. This puzzles

(*Continued on page* 43)



FISH CANNOT LIVE IN LAKES INFESTED WITH WATER HYACINTHS

Florida's Stricken Waters

(Reprinted, with permission, from Florida Wildlife, April, 1949)

by BILL WEEKS and HOWARD R. BISSLAND

This is the first of a series of articles on the Water Hyacinth.

FLORIDA is a land of stricken waters. Some are merely tinged with sickness; some are dying; others already are dead, strangled by a garrot of tender leaves and flowers. Our waters are our pride and joy—our bread and butter; yet virtually all lie unattended while a green and growing cancer gnaws at their vitals. In six decades we have allowed a handful of water hyacinth seeds to germinate into a creeping threat to every fresh water lake and stream in the state. It sounds frightening—and it is!

The State of Florida has nearly 2,500,000 acres of potentially fishable fresh water—more than any other state in the union. Because of a natural fertility and the tourist dollar, our lakes and streams have one of the greatest annual cash yields in the country. The U. S. Fish and Wildlife Service figures their annual per acre return in fish and waterfowl at $21.27—nearly double the estimate for any other southern state.

Today more than 250,000 of these valuable acres have been damaged or ruined by water hyacinths. Out of every 100 acres of water in Florida, 2½ acres are seriously infested with hyacinths; for every acre actually infested three more are blocked off and rendered useless for any practical purpose. In other words as it stands now, a harmless looking plant with purple blooms is claiming 10 percent of the inland water of Florida. At the present rate of spread, the toll will be doubled inside another decade.

For years hyacinths have been regarded as purely local infections, except in navigable streams where commerce was affected. The city or community dogged by the virus complained about its affliction; occasionally when the pain became too severe it picked ineptly at its sores until at least part of the scabs had been torn away. The pain was local and treatment was sporadic. The general public has never had more than a hazy idea of the extent of water hyacinths in Florida. Until recently there were no figures and very few estimates on the total area of infestation. Even now these figures are known only to a handful of U. S. Engineers and the authors.

Actually Florida contains a total of 62,991 acres of hyacinth-choked waters. The weeds have inched their way into 55 of our 67 counties, and have spread their tentacles into 530 of our 1,500 creeks and rivers. They thrive in concentrations ranging from tiny, picturesque garlands to

THIS LAKE IS ALMOST COMPLETELY COVERED WITH HYACINTHS

solid, matted blankets shrouding entire lakes. The U. S. Engineers have separated the concentrations into four classifications—sparse, moderate, dense and very dense. Sparse is the label tacked to any weed-affected area that can claim at least 50 percent open water. If the area has less than 50 percent open water, but is still fairly accessible it is classified as moderate. Dense is any area where only splotches of open water are visible, and very dense means a solid impenetrable mass of hyacinths.

Significantly, very few acres of molested waters are classified as sparse. Once the pestilence gains a foothold it is off to the races. Dr. William T. Penfound of Tulane University found that under optimum conditions water hyacinths *would double their number on an average of once every* 12.5 *days.* He estimated that in one good eight-month growing season 10 plants could multiply into enough hyacinths to completely cover an acre of water.

Of the total acreage of plagued water, 21,934 are classed as moderate, 22,801 as dense and 14,289 as very dense. About 27,000 acres of the total can be traversed by boat fairly easily; on 10,808 acres the going is difficult, and 25,314 acres are totally inpenetrable. It is this last category that effectively isolates an esimated 200,000 acres of fishable water not directly affected by the weeds.

The leafy pest is no respecter of water-ways. It paralyzes beautiful clear-running streams as completely and hopelessly as it does mud-clogged drainage ditches. The army engineers say 25,079 acres of lakes and ponds are wrapped in a suffocating coat of hyacinths; almost the same area is covered in our non-navigable natural streams. Despite federal control efforts, our navigable streams still have their share of weed trouble. The engineers figure that slightly more than 7,000 acres of such waterway is beseiged by hyacinths.

All these figures come out of a two-year aerial survey by the U. S. Army Engineers. They are not rough estimates or guesses, but the result of cold computations made from aerial maps charted and pin-pointed by low-flying observers, who covered every inch of the state. The figures have never before been made public, but will soon be transmitted to the Congressional Committee on Rivers and Harbors.

A year before the Engineers began their survey, Congress asked the U.S. Fish and Wildlife Service to give some study to the game and fish angle of Florida's hyacinth problem and report its findings. In February, 1947, the report was submitted. In it the federal service estimated that hyacinths were costing the state more than $5,000,000 a year in hunting and fishing business alone.

This report was based on conditions four years ago, when fishing pressure was less than half what it is today. This year approximately 300,000 people, including 80,000 nonresidents, will buy licenses to fish the fresh waters of Florida. More than 600 fishing camps from the Choctawhatchee River to Lake Okeechobee will cater to their needs. These camps maintain 1,094 cabins and 5,100 boats, representing an annual investment of $3,500,000. Last year nearly 20,000 duck hunters killed a quarter of a million waterfowl. The income from this harvest was worth over $1,000,000 to the

A COLONY OF WATER HYACINTHS IN FLOWER

state's hunting lodges, service stations, sporting goods dealers and whiskey stores. In its 1947 report the Fish and Wildlife Service pegged Florida's annual income from fresh water fish and waterfowl alone at $53,165,000. Today that estimate would be ultra-conservative.

The maintenance of such an income depends directly upon the continued health and productivity of its source. In other words it depends upon a fertile and accessible network of waterways. *With the possible exception of pollution, water hyacinths and allied pests are today the worst single enemy of Florida's fresh waters.* One of the South's foremost authorities on stream improvement told us recently that, from a fish and wildlife standpoint, hyacinths were actually causing more damage than pollution. He accepted pollution as a worse menace only because of the difficulty and expense of controlling it.

Hyacinths strike at fish life in half a dozen different ways—all of them destructive. The plant can claim only 10 percent of a small lake and still destroy its game fish crop. To spawn, bass and bream either drape their eggs on submerged vegetation or deposit them in scrupulously clean beds. If there is a free-floating mass of water plants in the lake, sooner or later it will sweep over the nest, destroying the eggs and driving away the spawning fish. If it obscures the sunlight long enough even the submerged vegetation that furnishes the bed will be killed. Fish soon refuse to spawn under such uncertain conditions.

Because they are in a state of constant decomposition and because they block off normal aeration, hyacinths are notorious robbers of dissolved oxygen. Where there is anything above a moderate concentration you will find the oxygen content of water about one part per million. Three parts per million is the minimum ratio required for game fish survival. When hyacinths sap the oxygen from the water, bass and bream have two alternatives—move on or perish. If there is no place to move, they perish.

On the tail of a series of high-waters last year one of our South Florida cities was plagued for several weeks by odoriferous rafts of dead fish which kept drifting in on one of its drainage canals. The populace was alarmed and puzzled by the

THE LEAVES HAVE FLOATS FOR BUOYANCY

epidemic. Actually it was no "epidemic" at all; it was simply another costly by-product of water hyacinth encroachment. The backwaters of our watersheds almost inevitably succumb to invading hyacinths during long periods of high water. This drives the fish into the open channels that remain; then in the summer when the water goes down, drainage from these oxygen-depleted backwaters sweeps into the fish-crowded channels. The result is another "epidemic" of suffocated bass and bream.

Predator control and balance are two important pieces in the jig-saw puzzle that makes up a well-managed fishery. Hyacinths can kick both to hell and gone. The gar fish is our worst predator, and undoubtedly the most ill-regarded species of underwater life in Florida. Alligator weeds and water hyacinths are his only friends— and visa versa. The gar can breathe air; consequently he survives happily in a body of water almost completely devoid of oxygen. In hyacinth infested areas game fish are forced to congregate in what little open water is available. This makes them a sure-fire target for the preying garfish. The ultimate result is always the same—a lake full of worthless predators and no game fish.

Shoreline hyacinth infection may have a somewhat opposite effect by disrupting the balance in favor of forage fish like bluegills. Such aquatic mats destroy almost completely the shoal-water spawning grounds of the bass. Bream and other panfish, however, are able to spawn in deeper water. A few years of this sort of thing will leave an overpopulation of bream and virtually no bass.

The water hyacinth vitally affects every type fisherman whether he is a rod-and-reeler, trot-liner or netter, but the man who stands to lose most is the cane-pole addict. The federal report to Congress pointed this out.

"The cane-pole fisherman has been hardest hit by hyacinths and alligator weed," the report said. "The roadside borrow pits, canals and small ponds in which he fishes are most susceptible to weed infestation, and will eventually be destroyed if the pest is not controlled."

It is difficult to estimate Florida's hyacinth damage to waterfowl. Experts, however, figure that approximately one-third of our fresh water duck marshes are either infected or directly threatened by the green menace. These marshes support fully half of the state's normal winter influx of 1,000,000 birds. Waterfowl must have both resting and feeding grounds. In Florida, the Fish and Wildlife Service reports, alligator weed and hyacinths are encroaching upon and destroying both to an "alarming degree." Any surface-covering aquatic overwhelms and kills all-important marginal duck food plants. As it creeps over a feeding ground, the ducks concentrate on what open area is left. The result is a depleted food supply, an inordinately heavy kill and an open road to parasitism and disease.

All these creeping inroads on our fish and wildlife, the federal service estimates snowball into an annual cash loss to the state of exactly $5,316,500.

Five million dollars is by no means chicken-feed, but reliable authorities figure it is less than half the total damage caused by hyacinths each year. Louisiana estimates her annual loss to hyacinths at 10 to 15 million dollars. Though Florida's infestation area is smaller than that of Louisiana, the resources affected are more varied and more valuable. Where our crop value per acre is figured at $21.27, Louisiana's is esti-

mated at only $15.67. The values of other affected resources are pretty well proportionate.

Water hyacinths are no one-shot menace. They strike at a dozen different interests from a dozen different angles. Commerce, flood control, irrigation, agriculture, fish and wildlife, and even public health—all are vital to the state and all are besieged and encroached upon by the purple menace. Even aviation has had trouble avoiding the taint of the hyacinth. At an army engineer hearing in Tallahassee three years ago, former State Aviation Director William C. Lazarus testified that hyacinths were playing havoc with the development of amphibious and seaplane bases in inland Florida. Despite the fact that Florida boasted a greater water area than any other state in the nation, Lazarus pointed out that at the time the state had less than 40 seaplane bases. He added significantly that three-fourths of these were on salt water, in spite of the fact that salt water corrosion was known to create a tough maintenance problem. The indication was that expensive maintenance was preferable to landing on a floating island of hyacinths. The U. S. Geological Survey pointed up the problem when floating hyacinths caused it to abandon a plan to use seaplanes in reading water level gauges in the Kissimmee River.

Lazarus' testimony came at a time when builders were swamped with a backlog of 25,000 seaplane orders, yet there was less than a handful of dealers in the inland counties of this state. He estimated our hyacinth-studded lakes had held up a potential 3,000 ship market in South and Central Florida. More recently shifting banks of water cost a GI flying school in Polk County its contract with the Veterans Administration. The seaplanes the school operated were hemmed in so often by hyacinths, that students consistently failed to get their required flying time. When the VA withdrew its approval the school promptly folded—another one of those economic casualties, chargeable to the water hyacinth.

What the hyacinth has done in the air can be multiplied many times over and applied to ground and water commerce. The State Road Department spends thousands of dollars each year literally to keep the hyacinth off the highway. There isn't much likelihood of the pavement itself becoming a host, but there are 4,000 miles of roadside ditches in the state that must be constantly guarded against encroachment by floating acquatics. A few years back, in the Okeechobee section, highwaters floated such a mass of hyacinths onto the highway that traffic had to be detoured for two days while the mess was cleared away. About three years ago a man and his son were seriously injured on the Tamiami Trail when their automobile skidded out of control on a drift of slippery hyacinths. Last year in Louisiana a hyacinth-covered borrow-pit cost a man and his wife their lives. The couple's car went out of control and plunged into the six-foot waters of the pit. Two fishermen saw the car sink less than 10 feet from the road, but the area was so congested with a withering mass of plants that it was 50 *minutes* before the men could get to the car and wrench open a door.

Hyacinth jams are the annual headache of practically every county engineer in South Florida. Every year when flood waters are rampant extra crews have to be hired to clear away packs of hyacinths that pile under bridges and over roads. In 1933 hyacinth jams cost Hillsborough county every county bridge crossing the Hillsborough River. Engineer E. W. Carroll reported that some of the drifts were so packed they had to be sawed out with crosscut saws. An 80-foot section of one bridge had to be torn away before the tangled dam of weeds could be broken. Another bridge was pushed completely over. Carroll estimated the hyacinth damage to bridges alone that year at over $50,000.

Though few people realized it, water commerce is still an important part of Florida's business, and over a period of 60 years water hyacinths have menaced it constantly. If it were not for the constant vigilance of the U. S. Engineers, barge lines operating in St. Johns and Withlacoochee Rivers and the Okeechobee Waterway would have had to close up shop years ago. Even with the Army pouring $70,000 a year into the fight, the hyacinth problem in our navigable streams is still acute. At a hearing in West Palm Beach a couple of years ago, the Murphy Construction Company testified that it required a total of seven days to move a barge load of machinery from Lake Okeechobee to Belle Glade—a distance of some four or five miles. One single stretch of hyacinths held up two tugboats, a dredge and a crew of five men for five days. The delay cost the company several thousand dollars.

Unfortunately for some and fortunately for others, Florida's hyacinth scourge is still fairly concentrated. Five counties — Polk, Okeechobee, Highlands, Palm Beach and Volusia—contain half of the hyacinths in the state. The worst infested areas are found along the Kissimmee, St. Johns, Withlacoochee and Peace rivers. There are 15 counties with over 1,000 acres of hyacinths in them. Ironically, the counties which depend heaviest upon their water have been hardest hit.

Polk County, for instance, advertises itself as a land of lakes. It has an estimated 300,000 acres of water within its boundaries; yet 10,347 of these acres are smothering under a cloak of hyacinths, and another 30,000 acres are hopelessly fenced off. In other words, nearly 15 percent of Polk County's total water area has been devastated directly or indirectly by hyacinths. In little Citrus County, which depends on hunting and fishing for its livelihood, more than *half* of the fishable water has been lost or damaged because of hyacinths.

Only 12 of Florida's counties, most of them west of the Apalachicola

(*Continued on page* 57)

Spring Problems—Picking the Winners

(*Continued from page* 37)

me, for my experience is that it grows big—up to 7 or 8 lbs. For a late cabbage, I prefer the Savoy type, but, for smooth leaf, Premium Flat Dutch is hard to beat.

Carrots. My catalogues list 19 different names. Imperator is good but is supposed to need deep, stoneless soil. Like most Connecticut soil, mine is stony but carrots do well in it. True, some of them have to deviate slightly from the strictly perpendicular in order to get around a stone or two, but they still taste the same, so why worry? Chantenay, a good "half-long," is the only variety which gets four listings; Danvers and Nantes each get two. Why not try one of the old stand-bys and another variety from the page of "specials"?

Cauliflower. For some years, my preference has been Snowball, claimed as exclusive by one large seedhouse, but listed in all catalogues. On the recommendation of an expert, I tried Purple Head this year and am enthusiastic about it. It is early, very tender and delicate in flavor and makes fine, large plants. It is stated that the purple color turns white on cooking, but I found that it turns a very pale green. You will not find it listed in all catalogues; try it if you can get the seeds.

Corn. Here, again, we are offered an all too lavish selection—53 names in four catalogues! If you have the space, choose four varieties maturing at different dates when sown at the same time. Stowell's Evergreen and Country Gentlemen (both white) and Golden Bantam and Marcross (both yellow) all get four listings, while Golden Cross Bantam, Carmelcross and Spancross get three. Midget varieties are supposed to be better for small gardens but my experience with them is that, while they do not grow tall, they need about as much ground space as normal varieties. I'll venture a suggestion: Spancross (69 days), Marcross (72 days), Golden Cross Bantam (85 days), Stowell's Evergreen (95 days).

Cucumber. I have had fine results with Vaughan's Sensation; some of my friends swear by Burpee's Hybrid; Davis Perfect, longer and slimmer, is a standard variety. This year (1949) an English friend sent me a packet of English greenhouse cucumbers. They seemed to like the U.S.A. and gave me an immense crop of very long (16 inches) and slender cucumbers with thin skins and a mild flavor. I have kept a few of the seeds and am going to see what develops from them in the coming summer.

Endive. For years, I grew both green-curled and broad-leaved. Now I grow only the broad-leaved—Batavian Full-heart. A wonderful salad for late fall.

Lettuce. The most satisfactory lettuce for the home garden is, I am convinced, Oakleaf. Its vitality is astonishing; it will grow under all conditions and in my garden, this year, even came through the prolonged drought. Bronze Beauty is Oakleaf with a sunburn; I find it good, but not as tender or as sweet as Oakleaf. If you can start seeds in a coldframe or greenhouse or in a cool room in your house, Bibb has a finer texture and flavor than any lettuce I have ever grown, but it bolts quickly in hot weather. It can be grown successfully in the fall in a coldframe if sown early in September. Grand Rapids and Black-seeded Simpson are good loose-leaf lettuces; for heading varieties, I like May King, Mignonette and Pennlake.

Muskmelon. Unless weather and climatic conditions are very adverse, any organic gardener should be able to grow superb muskmelons. They thrive on compost. Bender's Surprise is a standard, but I had wonderful success, this year, with Pride of Wisconsin. It weighs up to 5 lbs. with superb flavor and texture. Some of my friends like the green-fleshed Rocky Ford.

Onion. If you grow from sets, your choice of varieties is limited. From seed, by all means grow Sweet Spanish—a mild white onion likely to surprise you by growing really big. Yellow Globe Danvers is my choice for yellow onions and Southport Globe for white or red. These varieties are offered by almost all seedhouses.

Peas. I choose an early, a midseason and a late and sow them all at the same time—as early as I can work the ground. Smooth or wrinkled, all seem to be equally hardy with me and as I find the wrinkled superior in quality I grow them only. Little Marvel is prolific and of good quality, but you must bend your back to harvest the crop. World's Record (also known as Early Gradus) grows to twice the height and is good. Thomas Laxton is my choice for mid-season and Telephone (Alderman) for late.

Spinach. Bloomsdale Long Standing seems to be the general favorite.

Squash. If you are a squash addict, you will want to grow three or four varieties. I grow only Zucchini (which bears from July to frost under favorable conditions) and Butternut. Butternut is the one variety about which I can show real enthusiasm; it is a new variety which was well worth developing. If you have room for only one, grow Butternut—but give it *plenty* of room, for it likes to ramble over the garden. It will give you squash from early August and a supply to store for winter use. If you can't wait for your squashes, have a hill of Early Straightneck.

Tomato. Here, again, the home gardener is likely to be bewildered by the number of offerings. After trying many varieties, I have decided that Marglobe, Rutgers and Stone are hard to beat. If you want a yellow variety; Jubilee is probably the best

Turnip. Purple Top White Globe for a white variety; for a fall crop of Rutabaga, Purple Top Yellow or Waltham Yellow.

(*Continued on page* 58)

GARDEN CALENDAR for FEBRUARY

by WM. H. EYSTER, Ph.D.

THE NORTH

Shrubs and Trees: The woody plants are in the dormant condition, but important changes are taking place in the buds which will develop into vegetative branches and/or flowers later in the spring. It is time to prune shrubs and trees, *but do not prune* spring-blooming ornamental shrubs until immediately after the blooming period. The purpose of pruning should be to enable the plant to most completely develop its inborn potentialities. (The Pruning Book by G. L. Wittrock, Rodale Press is most helpful to the pruner). Pruning should be done regularly so that nothing more than an ordinary pruning shears need be used. It is worth noting that most fruit trees have small vegetative buds and considerably larger flower buds. One of the purposes of pruning is to open up the top to admit sunlight and a free flow of air. In pruning shrubs, remove the oldest stems and the weakest of the new ones, leaving about a half dozen of the most vigorous stems. Old raspberry canes should be cut out if this has not already been done, and the tips may be cut back somewhat.

Do not burn the prunings, but rather cut them into small pieces with whatever equipment you have and return them to the soil as a mulch.

This is a good time to transplant evergreen and deciduous trees, roses and other shrubs in regions where the ground is not frozen. If you have no shrubs with brightly colored winter fruits, enter this need in your garden diary, and try to correct it before another year.

Flower Garden: The larger seeded annuals should be started indoors from six to eight weeks before the time to set them out. Sweet peas and other hardy annuals can be planted outdoors this month if weather conditions permit. Many gardeners regard Washington's birthday the optimum time to plant sweet peas. Plant the seeds about one inch apart and cover them with about one inch of soil. To insure healthy growth and an abundance of flowers, replace nutrients which may have been leached out of the soil by adding pulverized phosphate rock and granulated seaweed. For insurance against failure, use plenty of compost in the trenches and a good mulch on the soil.

Plants which usually seed themselves outdoors, as bachelor's button, godetia, candytuft, and others may be seeded this month. Virginia stocks, sweet alyssum, and dwarf godetia are especially adapted for seeding tulip beds. These fast-growing plants will screen the dying leaves of the bulbous plants after they are through blooming.

Inspect your stored bulbs, roots, and tubers to make sure that they are still in good condition. Do not fail to order all seeds and plants this month. For seed flats, use a mixture of 2 parts of good garden loam, 1 part of compost, and 1 part of clean sand.

THE WEST COAST

Flower Garden: Cut back mignonette, alyssum, ageratum, and petunia so that new growth may be formed and flowers produced before your new plants grown from seed come into bloom.

Sow in the open ground sweet pea, morning glory, stock, larkspur, double sunflower. Sow in flats having a good mixture of soil, compost, and sand, seeds of aster, Chinese woolflower, pimpernel, vinca rosea, Swan River daisy, and Browallia.

Plant hydrangea where there is very little sun. Renovate the fuchsias by giving them a liberal feeding of compost. By shaking off the very first aphids from your roses, you may solve the aphid problem for the entire season.

Tuberous begonias may be started in the dark by laying them out on boards and sprinkling them with water every day or two. When sprouted put them in wet peat or sphagnum moss until the sprouts are several inches long when they should be potted in soil rich in compost. Reset the chrysanthemums for fall blooms.

Shrubs and Trees: This is a good time to plant all kinds of shrubs and trees.

THE SOUTH

Flower Garden: Sow seeds of half-hardy annuals in seed pans or flats. Use plenty of compost for quick germination and good seedlings.

Inspect gladiolus corms, dahlia roots, and bulbs to make sure they are still in good condition. Compost the beds of spring-flowering bulbs. Interplant tulips with half-hardy annuals as soon as danger of frost is past. Plant seeds of the hardy annuals in the middle South, and tender annuals in Florida and along the Gulf Coast.

Set out seedlings just as soon as the season will permit. The following annuals may be set out in February: ageratum, alyssum, anchusa, snapdragon, candytuft, carnation, cornflower, Chinese forget-me-not, daisy, pinks, gerbera, larkspur, lupine, mallow, pansy, petunia, annual phlox, stocks, Sweet Williams, viola, and others that can stand cool weather.

The first gladiolus corms may be

set out the first week in February in southern Louisiana and at two week intervals thereafter for continuous blooms through the summer.

Shrubs and Trees: Roses should be pruned after the last killing frost. This also is the time to plant roses, abelias, pyracanthas, and privet. Cuttings of shrubs and trees may be made now. Late-summer blooming shrubs and evergreens may be pruned, but do not prune spring-blooming shrubs until after they have finished blooming. Plant woody vines, and do not omit jasmine and crossvine.

THE DEEP SOUTH *

Flower Garden: A list of flowers to plant in February, though not large, is: Ageratum, aster, balsam, scarlet runner bean, Chinese forget-me-not, Shasta daisy, dianthus, gaillardia, amaranth, ornamental gourd, ornamental sunflower, strawflower, marigold, nasturtium, phlox, petunia, portulaca, salvia, tithonia, verbena, periwinkle, zinnia. Where water hyacinths are available, one can make a handsome appearing pool, or even a bird bath, by filling it with these water-borne flowers. As no earth is required, the depth of the water can be anything from a few inches to a pool large and deep enough for goldfish, etc. A few plants left to themselves will send out new growth and multiply rapidly.

Vegetable Garden: In case of any loss of plants through frost in January, replanting can be done in February, as all seeds suitable for planting in January are also suitable for February. Plant beans of the bush variety, beets, Brussels sprouts, cabbage, Chinese cabbage, cantaloupe, carrots, cauliflower, collards, corn, cucumbers, eggplant, endive, kale, kohlrabi, leeks, lettuce, mustard, onion seed and sets, parsley, parsnips, peas, peppers, potatoes, radishes, romaine, rutabaga, spinach, squash, Swiss chard, tomatoes, turnips, watermelons.

Trees and Shrubs: All danger from frost, usually, is over by February, though it occasionally comes this month. If weather forecasts indicate danger, such things as banana plants, papayas, with their heavy weight of bulky fruit are difficult to protect. Covering with burlap or other material will help where there are not many plants to deal with. For large plantings open wood fires are recommended unless the expensive installations are in use. The year 1947 will be remembered for the one night in February when many central Florida groves and gardens suffered from a real freeze, ice being formed a fraction of an inch on open surfaces such as water in poultry fountains. Small papaya plants can be banked up to the tops and though these may be frosted, the trunk and roots will be saved and a good start will be made early in the spring.

THE SOUTHWEST **

Flower Garden: February is one of our busiest planting seasons in the Southwest, especially near the coast and in the warmer valleys where the soil is light enough to handle easily. Hardier things can be rushed in to get the early crops. All available composted material should be spread and incorporated in the top layers of the soil. New compost bins can be started. Keep your worms and sow-bugs busy. Use Humisite as an activator whether you are starting from scratch or are following regular routine. Do not use lime or wood ashes in the semi-arid west. The soil is already alkaline enough. Rakings from Bermuda lawns make the finest sort of compost, and you should capitalize on all the lush green weeds of the winter growing season.

Flowers: Set from flats such annuals as snapdragons, stocks, pansies, violas, Iceland poppies, forget-me-nots, calendulas, and primula malacoides. Set such perennials as English primroses, delphinium, rudbeckia, phlox, grass pinks, Shasta daisies, pentstemons campanulas, aquilegias, thalictrums, and coreopsis. Sow in the open the last planting of hardy annuals and native wild flowers. Use Payne's fine centennial mixture. Such plantings should only be made where there is an adequate supply of water. In cooler localities (at altitudes and the seacoast) a planting of Cuthberton's sweet peas can be made. Agapanthus, amaryllis, Amocrinum Howardii and hybrid montbretias can be put in. The next planting of gladiolus is due. Set in flats of peat your dahlia tubers and bring on in heat, sprouts for cuttings to be set out later. Tuberous-rooted begonias and gloxinias can be started in the same way. Sow with bottom heat, seeds of begonias, lobelia, petunia, dahlias and verbenas. In covered seed-beds in the open, sow seed of hardy perennials such as gaillardias, delphiniums, hardy pinks, anchusa, rehmania, stokesia, linum and nierembergia. At the same time you can sow seed of annual aster as they take a long time to develop and are better by being started in an open seed-bed without heat.

Trees and Shrubs: February is the ideal month for planting large balled stock of the standard conifers and broad-leaved evergreens. Be careful not to break balls in handling. Untie at the top of the sacks and turn back the corners, the burlap soon rots. From pots and cans almost any kind of hardy material can be planted so as to get a good start before the hot weather begins. While the camellias and azaleas are in bloom you can make your selections for future planting. Hardy vines can be set. Bare root roses and deciduous shrubs as well as deciduous fruit trees should be rushed in before the leaves start out. Large deciduous shade trees can be handled well at this season of the year either bare root or boxed. February is one of the best months for setting out all sorts of berries and grapes—The Pierce (California Concord) and the prolific Burbank are two of the finest types of Eastern Arbor grapes. If you want a crop immediately, plant two year old or older established stock. Use pomegranates and Japanese persimmons as ornamentals in the small home garden. Hard wood

(*Continued on page* 59)

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MEN OF ORGANIC FARMING

GUY CHAPMAN, D.D.S. (University of Pennsylvania), L.D.S., R.C.S. (Edinburgh)

Founder and Former President of the New Zealand Humic Compost Society

by T. W. M. ASHBY

IN A country of 1½ million people who depend either directly or indirectly upon the products of the soil for their livelihood, one man more than any other has worked to preserve the people's heritage. He is not a farmer, nor is he engaged in agricultural pursuits; he is by profession a dental surgeon, who, in the experience of life, has found it necessary to search right back to mother earth to find a satisfying answer to some of the problems with which he has been confronted. In so doing, Dr. Guy Brougham Chapman has become a lover of the soil, with the ardent fervour of the lover inspired with a deep affection, and not only a lover of the soil, but a teacher and philosopher, who has learned the truth of the doctrine of George Bernard Shaw that the only way to make an Englishman take notice is to squirt acid in his eye. He has, as it were, rebelled against the orthodox and conventional.

This has been the dominant note of the life and work of Dr. Guy Chapman; it is the inner spirit of a man human in outlook, possessed of an exceptional personal charm, easy and entertaining as a conversationalist, forceful as a lecturer, and a practical research worker. When he exaggerates, which he sometimes does, it gives point to what he has to say, but he never misleads you in so doing. Instinctively you know he is an enthusiast, and his brand of enthusiasm is very, very contagious.

But these qualities would not have sufficed to accomplish the task of making New Zealand compost-minded, which is possibly his most effective achievement. Something more than a natural driving force was necessary to shake from its lethargy a country whose whole agricultural practice was synonymous with chemical fertilizing. It required the foresight of a man who could see where a material policy of farming with water-soluble chemical fertilizers would lead, with its evils of soil erosion, destruction of fertility and its ultimate effects on animal and human health. Convinced as he became of these things, the genius of Guy Chapman initiated a crusade which to-day has made New Zealand aware of the place and value of organic manuring on garden and farm alike. Such recognition is nation-wide, and continues to grow. The exclusive use of organic manures is being steadily accepted as an integral ingredient of the country's agricultural economy.

Guy Chapman is not by birth a New Zealander; he comes from Australia, which is separated from the country of his adoption by 1,200 miles of the Tasman Sea. But Australians and New Zealanders have much in common, and in two world wars their men have fought together, and, in some of those unrecorded escapades in which the soldier occasionally becomes involved, they have fought one for the other. We in New Zealand have always conceded to the Australian that he is more aggressive, with something more of the devil-may-care spirit than the New Zealander. And so in Guy Chapman remains the inheritance of these qualities from grandparents who migrated from England to Australia over a century ago, and from a father who spent a long life amongst the pioneers who wrestled for fortune with timber and gold and sheep and cattle and heat and drought.

Guy Chapman was born in 1888 in Hay, a town of some 3,000 people on the Murrumbidgee River in New South Wales. His father was manager of the Bank there. Shortly afterwards the family moved to Wagga Wagga, a sheep, fruit and agricultural centre, and a few years later to Brisbane, the Capital city of Queensland. Incidentally, Guy's father later became manager of the Town Hall branch of the Australian Bank of Commerce in Sydney and retired at the age of 80 after what must be an Australian record of 63 years in banking. While at Brisbane, young Chapman attended the Brisbane Church of England Grammer School, and after completing his matriculation followed in his father's footsteps, and spent a year in banking at Brisbane. Then he went as teller and accountant to the Bank at Pittsworth on the Darling Downs, Queensland, amongst some of the most lovely country in the world, lying west of the Great Dividing Range and famous for the quality of its sheep. Next he moved to the untamed country in North Queensland, the Atherton Plateau, which today is the wealthiest dairying and cattle country in Australia.

In those days it was virgin bush and beautiful cedar, kauri, beech and silky oak were being cut. So the young banker forsook his stool and joined one of the timber companies getting out sleepers for the railway, which was at that time be-

ing constructed west from Cairns. He measured millions of feet of cedar, and spent weeks with the Australian aborigines, famous as the "black-trackers," who can follow tracks invisible to the civilized eye.

It is a good thing for some of us that parental insistence prevails in our formative years, and Chapman senior persuaded Guy to study mining engineering. So he went to that excellent School of Mines in Charters Towers of Queensland, did some solid study, passed his examination in six subjects at the end of the first year, and worked in the mines as a mileker. While at Charters Towers he took house with a dental surgeon, Dr. Butler Woods, and from that association became convinced that in that profession he would find something to which he could apply his full energies and enthusiasm. Added to this, he had come to the conclusion that to be a successful mining engineer in those days, one could not adhere too strictly to the truth in preparing reports if a prospectus had to be drawn up in the most attractive manner. He had made his decision, and his next step, at the age of twenty, was to go to the United States and study dentistry at Pennsylvania. While waiting for a ship, he worked for six months at the general post office in Brisbane.

So he went to Penn University at Philadelphia and worked hard. On his first vacation he took a job in the Gerard Trust Bank in Philadelphia. On his second vacation he worked as manager of a hotel at Belport on Long Island, having coloured his application for the position by stating that his father was an inn-keeper and he himself had been in the business all his life, but he was a howling success and organized sports and entertainments. Before he went back to Philadelphia; he bought a yacht and sailed from Long Island to Philadelphia without a compass, sailing past Atlantic City, through a canal and finally came into the Schuylkill River. The newspapers gave him headlines as piloting the first sailing vessel seen on the river. He must have cost the authorities some money because the by-laws required all bridges to open to allow a ship to pass, his mast was too high to pass below. On his third vacation he worked his passage to London on a cattle steamer to see the coronation of King George V, having learned that his father was on his way also. He spent fifteen days on board that ship with Texas steers and tough guys, and a murder thrown in for good measure.

Chapman witnessed the coronation, and then had charge on behalf of the Dean, of a London Exhibition of the International Dental Federation of the Penn University work. He lectured to professors from the whole of Europe. The exhibition ran for three weeks and demonstrated the whole of the dental course of the University. The Dental Association of Great Britain asked him to take the exhibit to Glasgow the following year. By that time he was a graduate, as after the first Exhibition he went back to Penn and finished his degree of Doctor of Dental Surgery.

MEN OF ORGANIC GARDENING

This is the second of a series of articles devoted to leaders in the field of Organic Farming and Gardening. Dr. Chapman was born in Australia, educated in the United States, but served his fellowman in New Zealand. The organic method is world wide in its appeal and in its application. This man had a keen vision, and fully realized the fundamental relationship between soil and health.

Dr. Chapman determined to take the British degree in dentistry at the Edinburgh Dental School, so after he had conducted the exhibition for the British Dental Association at Glasgow in 1912 he went to Edinburgh and spent fifteen months there, graduating Licentiate in Dental Surgery of the Royal College of Surgeons. He subsequently spent some time in partnership in London with Dr. Davenport, who had an exclusive clientele, among whom was Mr. Winston Churchill. But at the request of his father he decided to return to Australia, and he there commenced practices in Sydney. If he had viewed this change purely from a financial angle Dr. Chapman would have been compelled to admit a grave mistake, because Dr. Davenport's patients paid for their professional attendance at the rate of five guineas an hour. It is, however, a sidelight on Guy Chapman that he has never been motivated by monetary considerations; he does what he wants to do and the decision usually rests on the finer feelings that spring from the depths of heart and soul.

In the 1914-18 war Dr. Chapman left his practice in Sydney and obtained a commission in the Dental Corps, anticipating that he would be sent overseas forthwith. But the young captain was kept in a base camp, working hard at his profession until he could stick it out no longer, being anxious to serve with the real army. Tired of being in a base camp, he went to Sydney and enlisted as an artillery man, and left Australia for Europe as a plain Australian "digger." One day while on trek with his gun as an Acting Sergeant, a Colonel passed, stopped, went back and called the Sergeant aside. "What the hell are you doing in this outfit?" he queried. The upshot was that the Acting Sergeant in the Artillery was very soon starting at the bottom again as a Lieutenant in the Dental Corps, somewhat against his grain. The experience, however, was to have a profound bearing on his later outlook, for in his work he dealt with the peoples of many nationalities and countries, and saw first hand the physical and dental results of varying diets and conditions of living.

Dr. Chapman returned to Philadelphia after the war for a short refresher course, and went down as far as Columbia before returning to Australia, by way of New Zealand. He met many New Zealanders on the

run down from Vancouver in the R.M.S. "Niagara" including Prime Minister W. F. Massey and Finance Minister Sir Joesph Ward returning from the Imperial Conference in 1920. He came to New Zealand again in 1921, made a further trip to England by way of America, and returned to New Zealand to stay permanently and practice his profession at Takapuna and at Newmarket, both suburbs of Auckland City. He married and set to work to provide for the son and daughter who were to arrive in due time.

When Dr. Chapman settled down to a dental practice in what for him was a new country, it did not take him long to appreciate the high incidence of dental decay, particularly in the younger generation. The problem perturbed him. He had not come across such wide-spread dental disease hitherto. He had had a unique experience already as a dental officer; he had examined thousands upon thousands of men of all nationalities and peoples of many tribes before coming to New Zealand —in South America, India, and Australia. He had been attached to Guy's Hospital in London. Nevertheless, he found the dental conditions in New Zealand shocking, and set himself to find reasons. New Zealand was a young country with plenty of butter, milk and fruit; the people were from good Irish, English and Scotch stock. It was not breeding, not housing or clothing, climatic conditions might be a contributing cause, but he slowly got down to the question of food, including sunshine and fresh air. Here, he was convinced was the core of the problem.

The next twenty years were to see Dr. Chapman probing this wide matter of the nation's food habits, and in a variety of ways urging food reform. He tackled the general use of refined foods and urged the substitution of whole foods. It did not take him long to link up with the problem the fact of the fundamental stitution of whole foods. It did not take him long to link up with the problem the fact of the fundamental dependence of all foods upon the substance of the earth and upon the rays of the sun. What, he instanced, was the mineral and vitamin content of milk being given to school-children from "cow-sick" land? In conjunction with Mr. M. Walker, who practiced as a dietitian in Auckland, he formed, in 1927, the Food Reform Society of New Zealand. He talked sometimes to half-empty halls and unreceptive audiences. Newspaper reporters would listen for a while and then quietly fade away. Guy was dubbed "a bit of a crank," but his tenacity carried the day. A very keen bridge player, for seven years he played with a group of medical practitioners. His nick name from 1927 onwards was always "Vitamin Chappie." In those days vitamins were strange bedfellows, even to medicine. In a few years he was in demand as a guest speaker at all kinds of meetings. Nowadays a live interest in these matters is accepted as a duty.

In 1930 Dr. Chapman made a dental examination of a Maori boys' school. Seventy-five per cent of the pupils were found to be suffering from dental decay, and both incipient and advanced pyorrhoea. Their food was white bread, meat, peeled potatoes, and very little else. In this particular case, conditions have since been altered; but in the meantime those boys have gone back to their communities, taking with them the prevailing idea of "civilized" foods.

The first public application of the principles he advocated was at the Southwell School, Hamilton, a private boarding school with about 80 boarders in the centre of New Zealand's main dairying district. Dr. Chapman had sent his son there and was anxious that his diet should be correct. The headmaster agreed to put the children on a diet, which, among other things, included vitamins A and D. Dr. Chapman arranged for a large milk products company to make an emulsion of A and D, which was added to fortify the milk the children received. In the school garden organic methods of fertilizing were used. The scholars were supplied with wholemeal bread and had plenty of fruit. Their health was excellent; they produced invincible football teams.

In 1936 Dr. Chapman made an investigation into the food habits and mode of livelihood of the Aupouri tribe of Maoris. On the shores of the beautiful Parengarenga Harbour in the far North, close to Spirits' Bay, live about 850 Maoris, in two villages, called Te Kao and Te Hapua. For thirty years or more they had adopted the white man's foods such as white flour, polished rice, refined sugar, and tinned meats, in place of their old-time, wholesome foods. This change of diet had a deplorable effect on their dental and general health, and served as a vivid object lesson to everyone interested in the health of the New Zealand people. Chapman found that in one of the villages only two of the adults over twenty-three years of age were likely to retain their teeth. Pyorrhoea was so far advanced that extractions were the only solution. The children were all showing signs of gum margin inflammation, or gingivitis, as it was called. This bad state of health was noticeable even in children as young as four years of age. In children of about fourteen or fifteen years of age pyorrhoea was often well advanced. Dental decay was everywhere. So was tuberculosis. Throughout the tribe there are many cases of crowded teeth, the arches being cramped instead of being full and rounded, as they ought to be to allow plenty of room for all the teeth. He saw protruding teeth, giving facial expressions quite foreign to that of the true Maori, an unmistakable sign of faulty calcification, not only of the jaws, but of all the bony structures, and due entirely to an incorrect diet. The food in use was nearly all spoiled, either from "refining" or from bad cooking.

In the past, the Government medical officers and the district nurses had done their best to improve the diet of these Maoris; but the re-

sponse was disappointing; and in the investigation Chapman made, the humiliating reason for this apathy was brought to light. The white man had brought to the Maori a new religion and a civilization of new clothes and new dwellings. The white man had conquered the whole world, and therefore (reasoned the Maoris) his example must be worth following. The Maoris who made visits southward found the white man eating white bread in the railway restaurants (unable, in fact, to procure anything else). They found him eating sweets; they found him peeling and boiling potatoes and kumeras and cabbages instead of steaming them in the old-time way. The efforts of the Government medical officers and of the district nurses to persuade the Maoris to eat foods which they had seen the Pakeha himself careful to avoid met with distrust and suspicion. Shark oil and seaweed, two wonderful foods which once they ate regularly, they found to be shunned by the white race, and so they were dropped from the dietary of the Maori and are now scarcely ever heard of.

Chapman found similar conditions in other Maori villages, including cases of rickets. In one village, however, a wonderful and stimulating discovery was made of a group of children whose appearance and vitality were very different. Their jaws had full, rounded arches; their teeth showed no decay and only slight signs of gingivitis. So marked was their condition of radiant health that they were singled out for special inquiry. It was found that they lived on a beach where shell-fish and fish were easily obtained and where supplies of these splendid foods were constantly available. These children and their elders had retained just this one natural food in a diet otherwise predominating in "purified" and man-spoilt foodstuffs; yet, so potent was this natural food (teeming with vitamin D, iodine, etc.), they had the appearance and the strength of the magnificent Maoris of the early days.

As a result of the visit paid by Dr. Chapman to these two Maori schools at Te Kao and Te Hapua and the lectures and the instructions given, a vast improvement in health has since been recorded by both school medical officers and school inspectors, and the results were published in the New Zealand Education Department's Official Gazette in 1939. Citrus trees were planted in the school grounds, contrary to the regulations, but are there today as a living reminder of one source of healthy food, and a tribute to the sagacity and enthusiasm of Guy Chapman. When the time came for him to depart, the Maoris in appreciation begged him to stay among them, with all the privileges and status of a Chief. These are but a few examples of the fields touched upon by Dr. Chapman in his crusade. In December, 1937, he formed the New Zealand Women's Food Value League (Inc.), a socity which continues to maintain a healthy membership and publish a regular journal.

Dr. Chapman did work based on the Southwell School feeding experiment at the Mt. Albert Grammar School, a large boys' high school at Auckland. A published report stated that since the change to naturally-grown garden produce the periodical reports on the boys' dental condition had been more than gratifying. Skins are clear and healthy, and the boys increasingly active and virile. He also did similar work at the Kaharoa Maori School, and the results were described in the Government Education Gazette of the 1st of June, 1940, as showing a distinct falling off in skin-disease and a vast improvement in respect of teeth. More recently, from 1944 to 1946, he initiated experimental feeding coupled with compost-grown green vegetables at Manukau Intermediate School, in a suburb of Auckland. The two latter experiments broke new ground. They were aimed at supplying the vital minerals and vitamins from greens and milk which in 75 per cent of the children's diet are missed. The lunches were so selected and supervised, that provided the lunch was eaten the day's food intake was complete. All the Maori children at Kaharoa participated, but at the Manukau School 50 children only were selected as a control group. The medical officers, a dentist, and three specialists in child psychology and development took measurements and kept charts. The final report is now being submitted to the Education Department. Both experiments have proved the outstanding value of properly grown and prepared foods in improving and maintaining the health of the child.

Dr. Chapman is unexcelled as a popular radio lecturer. He has the capacity to get close to his audience. He has lectured on both the National and Commercial stations in New Zealand and in Australia. In a University-sponsored series of talks he lectured also on physiology. In 1936 he did a series of broadcasts from 1YA Auckland, which were published in the New Zealand Dental Journal. But his popular nutrition talks from 1ZB three times weekly, which commenced in 1938 and ran for five years, brought his mail at times to 600 letters a week. Some of these he answered directly; others were grouped and discussed over the air. Over 100,000 diet sheets were sent out. A series of these IZB Nutrition Talks were later published in half a dozen pamphlets, but because of the phenomenal demand they are now out of print. When he concluded the series in November, 1943, the Director of Broadcasting, Professor James Shelley, expressed thanks for the interest Dr. Chapman had shown in nutrition.

These broadcasts also brought letters from people who love the soil and they expressed their willingness to embrace the Indore method of conserving all so-called vegetable or animal wastes, because the doctor had made many references to the work of Sir Albert Howard, Sir Robert McCarrison, and other pioneers. In New Zealand, his was a

voice in the wilderness, but his enthusiastic advocacy was to bear fruit. During 1947 Dr. Chapman did six months broadcasting in Australia, being on the air five times a week from station 2UE, Sydney. Three talks each week were devoted to nutrition and two to soil health, the series being linked to show their interdependence.

Why have these lectures been so popular? The answer to the question, maybe, is to be found in that trait in Guy Chapman's character which has already been alluded to. The public has been intrigued by the unorthodox—by the man who has dared to cry out against things they have long doubted. But more, he has suggested a better way in substitution for that which goes into the discard.

Slowly but surely, interest had been aroused, and in 1941 Dr. Chapman called the first meeting to inaugurate a Society to further the knowledge and practice of the principles enunciated by the workers already mentioned. The name chosen, the "New Zealand Humic Compost Socity," seemed to cover the work that was contemplated. An exceptionally keen executive with headquarters at Auckland, although not the capital of New Zealand, is its largest city, and is well known to thousands of American servicemen who served in the Pacific in the second world war.

Towards the end of the year 1941 the Society issued its first magazine, a bi-monthly publication, which has since been published continuously and has provided many thought-provoking articles of a high standard. The Society grew rapidly, and branches were started successively in Wellington, New Plymouth, Christchurch, Wanganui, Dunedin and later in other centres of the Dominion to a total of sixteen. The Society had 440 members at the 31st of March 1942, and this had leapt to ten times that number two years later. The magazine output soon reached 50,000 copies a year. These were distributed free to members and the remainder sold on public bookstalls. The issue of "The Living Soil" totalled 25,000 in the first two years of publication, and the pamphlet has since had steady reprints. The Society also published, amongst others, a pamphlet on "How to make a Compost Heap," issues of which have run into 50,000.

In all centres the Society organized and conducted open-air meetings and publicized the organic method on the air and in the newspapers. At these meetings compost heaps were made using the Indore process; a lecturer explained the whole process, while willing workers made the heaps, and answered questions. This method of publicity has proved to be far and away the most satisfactory; people like to see a thing done. At all meetings the methods of using pits, heaps and boxes were fully explained and demonstrated.

Public lectures have been given all over New Zealand. One large open-air meeting in Wellington, which linked up with the Government-sponsored "Dig for Victory Campaign" in October, 1943, had 3,000 onlookers, and Dr. Chapman paid a special visit to give the lecture at the demonstration.

Dr. Chapman was President of the Society from its inception until 1946, when in view of his impending departure to Western Samoa and Tahiti on an extended visit, he asked to be relieved of the Presidency.

Such is the brief outline of the general scheme adopted to translate the ideals of a healthy soil into practical effect. But the work has not been confined to the back-yard composter. Steps were taken to seek a wider field of interest. The Agricultural Department, though an ardent advocate of artificials, particularly superphosphate, is not uninterested, as is witnessed by the fact that the Minister of Agriculture became a Vice-Patron of the Society. Massey Agricultural College (affiliated to the University of New Zealand) has built a series of composting bins and composts its large area of lawn clippings with the droppings from its pedigree poultry section.

Propaganda has also been actively carried on for the utilization of city and town wastes. The support of the medical profession has been enlisted and in June, 1946, the Dominion National Executive of the British Medical Association carried a resolution endorsing and supporting a petition asking Parliament to set up a Committee or Royal Commission to investigate the relationship between sewage conservation, soil fertility and plant and animal life. The Auckland Division of the B.M.A. in December, 1947, again reaffirmed its earlier viewpoint.

Help has been given to many enthusiasts in Australia to form societies in their capital cities. Active steps have been taken to interest the farming community, and most interesting results have already been pioneered by Mr. S. M. May, of Putaruru, on Dr. Chapman's advice, by fermenting cow-shed washings with skim-milk and feeding the liquid manure thus obtained to the fields with a specially-designed spray wagon.

What has been achieved? And what of the future? Under Dr Chapman's guidance a strong foundation has surely been laid. Many members have passed through the Society's ranks and are quietly and effectively practising the principles of soil health. The process continues, and will continue. If evidence of this is needed it can be found in the hearty reception accorded to the views of Colonel Sir Stanton Hicks, Professor of Physiology and of Pharmacology at the Adelaide University, the guest speaker at the New Zealand Branch of the British Medical Association held in Auckland in February 1946, and the publication in the Dominion's leading conservative newspaper, "The New Zealand Herald," of February 19th, 1946, of a lengthy article from his pen attacking the Liebig theory and urging a return to the ancient humus plant food theory.

(*Continued on page* 60)

Guy Chapman has been a frequent contributor to popular and professional journals; he is, nevertheless a speaker and lecturer rather than a writer. In 1937 he published "Modern Food Habits" dedicated to

ALL MOTHERS
who, having faced Death to
create Life,
should be the most eagar to
prolong it.

In 1939 he published in conjunction with Miss Violet Lowe, "Menus, Recipes and Why? Then followed "The Peoples Food." In 1945 he made use of the knowledge gained in his five years of continuous broadcasts of health talks and published "Nutrition."

After twenty years of active public propaganda in advocacy of his convictions Dr. Chapman felt that he needed a rest. He had carried on a strenuous dental practice, which had not become any lighter during the war years. So in 1946 he decided to pay a visit to Western Samoa and Tahiti. He had, in 1938, visited the Friendly Islands and during that visit had examined many native inhabitants. One particular island he visited on the first occasion was Riatea, from which the ancestors of the present Maori population of New Zealand are said to have migrated in 1600. He wanted to compare the life and health of the Friendly Islanders with the Maori of to-day, but he found that the indiscriminate use of processed foods had taken its toll and the Islanders were suffering dreadfully from the effects of malnutrition. He did everything possible to impress the population, including school-children, of the benefits of a correct diet. His 1946 visit was really a continuation of that made eight years earlier, but he found conditions were even worse than before. He reached the sad conclusion that in the absence of proper diet control the position was even worse than before. Discussing the matter on his return to New Zealand at the end of 1947, he said the need for supervision was an urgent one, and this was recognized in Australia. However, as the Friendly Islands are under French control, nothing effective can be done from New Zealand.

Dr. Chapman visited Western Samoa and was the guest of the Administrator at Government House. He found the nutrition question much more effectively handled in this territory. He had, for example, no difficulty in forming a Branch of the New Zealand Compost Society in Apia, the capital, and demonstrations of compost-making were popular events. While in Apia, Dr. Chapman found that the old road leading from "Vailima" where Robert Louis Stevenson lived to Vaea Hill (on the summit of which Stevenson was later buried) had become reduced to a mere track. In years gone by that road had been built by the Chiefs as a mark of gratitude to Stevenson. Dr. Chapman enlisted the work of the Samoans, the road was cleared, and on the 24th of May, 1947 (the anniversary of the birthday of the late Queen Victoria), an arbor day was celebrated and the road boundary was planted with the rarer native trees. They were planted of course, in the only way acceptable to Guy Chapman, namely, by seeing that each hole was first filled with well prepared compost. The roadway bears the name of "The Road of Loving Hearts," in affectionate tribute to the memory of Stevenson. Dr. Chapman found that in Samoa the cocao bean was subject to the same disease that Sir Albert Howard found in Trinidad, due to wrong manuring. He discussed the matter with the planters and pointed cut the possibilities of remedying the position with compost.

Before he returned once more to New Zealand, Dr. Chapman spent six months in Sydney, Australia, giving, as already indicated, regular radio talks. He desired to go to New Guinea and study diet there, but was unable to do so. He had to content himself with accepting an invitation to give the Australian boys being sent to New Guinea as Patrol Officers in charge of districts, their final lecture at the Training School in Sydney, when he stressed the part that food and soil played in the health of the people.

Dr. Chapman intends to return to his dental practice. But who could forecast the next activity of this amazing man? His brain never slips into neutral. It has only one gear—high. His energy must find an outlet. The rebel in him must fight—but the cause must needs be a worthy one.

(*Note*: Dr. Chapman's home address is Titirangi, Auckland, New Zealand.)

The Soil and Health Foundation

SOIL AND HEALTH FOUNDATION

A report of the cancer experiment with mice, conducted by Dr. Ehrenfried Pfeiffer, has just been mailed to all of the members of the SOIL AND HEALTH FOUNDATION. In this experiment the mice were fed in two groups, one with food raised with chemical fertilizers and the other by the organic method. The results were extremely significant. It has been decided to continue one simple phase of this interesting experiment. A cancer-inducing substance is to be rubbed on the skin of all the mice, to see which group can resist it better. The results will be known some time during 1950.

The SOIL AND HEALTH FOUNDATION is a non-profit institution and is run by voluntary contributions received from the general public. Contributions may be in any amount, and are deductible on your income tax return.

SOIL AND HEALTH FOUNDATION
46 South West Street, Allentown, Pennsylvania

CONTROL CUTWORMS

We discovered that cut-worms are quite choosey in their diet, preferring certain kinds of weeds, so it is well *not to weed too thoroughly.* A wilted weed will betray the presence of a cutworm which can easily be unearthed and destroyed, thus saving the vegetable garden.

We also discovered that the cutworms invaded the garden from the surrounding grass, *from all sides.* Knowing that they prefer sunflowers to any other diet, we planted several rows of sunflowers very thickly *as a border for the garden*; then, on spying a wilted sunflower, the guilty "varmint" soon paid the penalty of sin. The year we did this (in Saskatchewan) was a particularly bad year as crops were reduced in many cases 50 to 75%. Everyone for miles marvelled at our garden as theirs were in many cases 75% destroyed and some even more, and had to be reseeded.

As an example of how well this worked—in one typical morning in which we took a count—there were over 100! The danger period lasts only around two weeks.

H. Hoehn, R. R. No. 4,
New Westminster, B.C., Canada

—o—

WOOD-PILE SOIL FOR VEGETABLE PLANT BED

For my vegetable plant bed last spring I used the dark soil from where our wood pile has been located for ten or twelve years and mixed it with half as much sand. This I put about three inches deep in a cold frame and in this planted all my vegetables and flower seeds, covering the bed with cheesecloth.

The result from this plant bed was more than satisfactory. All seeds seemed to germinate. Plants grew well and were unusually strong with excellent roots at planting time.

I found this type of soil preparation to be fifty percent more productive than the old method of using commercial fertilizer, as I had done for the past twenty years.

Mrs. J. R. Franck
Scotland Neck, N. C.

PRUNING THE GRAPES

Pruning the grape is not difficult but it is important. The fruit is produced on the wood of the current year, that is on the new growth. The vine-type of pruning is applied to American species of grapes, as they are natural climbers and do best when permitted to grow on a trellis. As soon as the plant is well established, about 6 vines are permitted to grow out of the top of the stem. Of these, three should be trained in one direction and the other three in the opposite direction. It is best to select stems which are about ¼ inch thick. All lateral stems should be cut back to about 3 buds. From these buds will develop the new vines on which the fruits will be formed.

FRAGRANT ROSES

The ten most fragrant roses as determined by the Directors of the American Rose Society and the Nurserymen respectively are:

Directors Choice

1. Crimson Glory
2. Etoile de Hollande
3. Mirandy
4. Heart's Desire
5. Hector Deane
6. Girona
7. Neige Parfum
8. Golden Dawn
9. Christopher Stone
10. Dickson's Red

Nurserymen's Choice

1. Crimson Glory
2. Mirandy
3. Heart's Desire
4. Etolie de Hollande
5. San Fernando
6. Girona
7. The Doctor
8. Golden Dawn
9. Hadey
10. Bubaiyat

W. H. Eyster

—o—

FOXGLOVES

Foxgloves are biennial plants which thrive best in a deep, rich soil. When grown from seed, they should make a good vegetative growth during the first season and produce abundant flowers, fruit, and seeds the second year and die. It is important to plant the seeds early in the season so that they complete their vegetative growth before cold weather forces them into dormancy. If plants do not complete their vegetative growth during the first year from seed, they often continue to grow vegetatively the second year and fail to bloom or seem to bloom reluctantly. Plant foxglove seeds early in well-composted soil.

W. H. Eyster

BETTER COMPOST BETTER SOIL

Prettier Flowers, Superior Vegetables and Fruits

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ActivO gives you the power to make soil and plants respond as Nature intended

ActivO is a remarkably RICH, black, velvety HUMUS fortified with billions of Nature's own helpful micro-organisms — plus minerals, biotics, anti-biotics, hormones, vitamins and other growth substances which plants MUST have for healthiest growth, blooming and fruiting . . . and which most soils can't supply in amounts needed or may lack altogether! . . . With this unusual product you can do a lot of unusual things:

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With ActivO you can energize hot beds and mushroom compost . . . reduce odor in outdoor toilets, while converting waste into odorless ash-like humus . . . ActivO does not injure earthworms in either soil or compost. Contains no chemicals. DO NOT ACCEPT SUBSTITUTES. SEE YOUR DEALER TODAY; and send coupon below for free details.

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- ☐ **No. 7 size, for 1700 lb. compost, $2.00, p'pd.**
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Name & Address .....

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P. O. & State .....

Dealer's Name & Address .....

.....

ACTIVO

Organic Soils Behave

(Continued from page 21)

The methods of the mineral school are not quite adequate to cope with them.

There is one phenomenon which is frequently observed in the field. And this is that quantities of available minerals after rain, and/or with sufficient moisture, will "push" a crop. Fast growth of grains is evident in spring and early summer. When drought sets in these crops come to a standstill, and start to head out much too early. Organic soils result in a slower growth during the same period, but the plants continue to grow on into the dry season, head out later, and thus accumulate more weight. Consequently, these plants have more time to gather up minerals, which explains the fact, observed in spectral analysis of plant tissue and seeds, that they have a higher mineral content even though they were grown on organic soils with less available minerals present. A slow initial growth, but continuing over a longer time also makes these plants more resistant to diseases.

When the understanding for these fundamental differences is more advanced, there will no longer be any antagonism on the part of the soil chemist toward the organic method. Even the fertilizer-minded superiority of an organic soil, for fertilizer will become more effective. With less, more can be done, since no undue losses occur.

YOU OUGHT TO TRY THIS

Made from sea-going fish, ATLAS is a complete fertilizer, all organic—contains 22 plant food essentials. Feeds all kinds of plants — and the helpful soil organisms. Can't burn. Compost matures faster, earthworms multiply.

New growth and health for potted plants, lawns, flowers, vegetables, fruits, trees and shrubs. Concentrated —add water—apply with watering can or new GRO-GUN hose applicator. PINT makes 30 to 80 gals.—$1.00 postpaid. *DEALERS—Write for proposition.*

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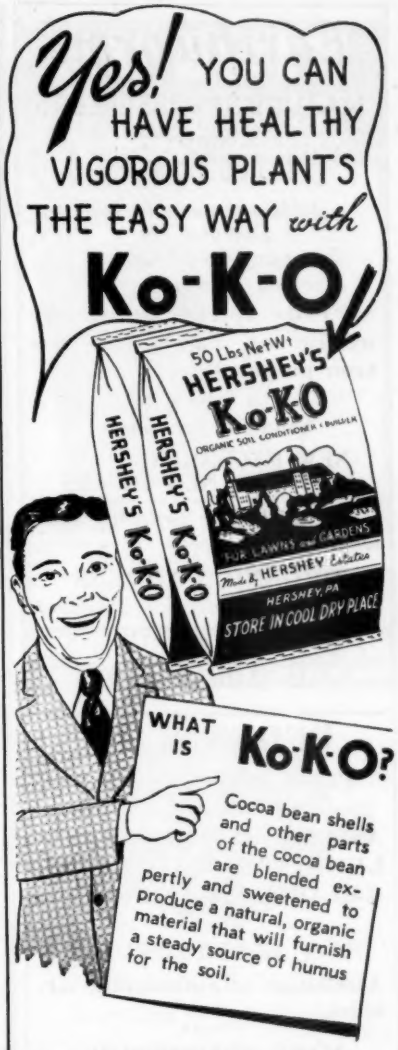
Yes! YOU CAN HAVE HEALTHY VIGOROUS PLANTS THE EASY WAY with Ko-K-O
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ORGANIC SOIL CONDITIONER & BUILDER
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STORE IN COOL DRY PLACE
HERSHEY'S Ko-K-O
HERSHEY'S Ko-K-O
WHAT IS Ko-K-O?
Cocoa bean shells and other parts of the cocoa bean are blended expertly and sweetened to produce a natural, organic material that will furnish a steady source of humus for the soil.

FOR LAWNS AND GARDENS

- **Apply Direct to the Soil**
- **Mix in the Compost Heap**
- **FEED TO EARTHWORMS**

An essential material for the Organic Gardener . . . A slow-acting, long-lasting energizer that increases and replenishes the organic content of the soil . . . Improves soil texture . . . absorbs and retains plant-nourishing moisture . . . helps decomposition of soil break-up into humus . . . binds sandy soils . . . loosens clay soil.

Packed in Handy 50 Lb. Bags

If your dealer cannot supply you we will ship direct to you where Pick-up and Delivery is available; if not available shipped to nearest freight station. Freight prepaid East of Mississippi River. (Write for freight rates west of Miss. R.)

NEW LOW PRICE

Send $1.90 for each 50 lb. bag; enough for 200 sq. ft. of NEW lawn or garden. Minimum Shipment 100 lbs. (2 bags)

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NATURE'S SUBSOILERS
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Adds nutriments to your
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Put them to work turning it

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WRITE FOR PRICES TO

Seacoast Products Co.
EDGEWATER PARK, N. J.

An Oscar for Phlox

(*Continued from page* 22)

when arranged in individual beds on the lawn or in the garden. Here again the individual may choose to mix the colors or emphasize any one color. Some very beautiful varieties which have been tested and tried are: *Charles Curtis*—an outstanding sunset red which does not discolor in the sun or fade with age. It makes a brilliant and colorful companion for *Mary Louise* whose heads are pure white of unusually large size. *Augusta* produces a brilliant cherry red flower which remains under all weather conditions and has exceptional qualities. As for a good pink, *Columbia* has a remarkably clear tone and pronounced brilliance. It has also been called the "perpetual flowering" Phlox.

There are many other good varieties that could be mentioned. I suggest that you secure various flower catalogues and check for other colors and varieties that you might like to try. There are small varieties that lend themselves to the rock garden, or you may want to use them in conjunction with your rose bed. For a most beautiful contrast in color, plant a bed of Regal or Madonna lilies and border them with mixed color Phlox. It will produce a sight not easily forgotten.

If you have never tried raising these most beautiful flowers, I hope this brief chat inspires you to make a beginning. Their simplicity of care and practical usefulness will richly reward you for your efforts.

—o—

Organic Gardening Clubs To Be Organized

All persons interested in becoming a member of an Organic Gardening Club please contact the person in your area who is in charge of organization;

N. E. Bartholomew,
Cooperstown, N. Y.

Dr. A. L. Sumley,
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- Promotes Growth of FLOWERS, LAWNS, BUSHES, VEGETABLES, POTTED PLANTS..
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You'll be amazed at the way your growing things *thrive* on BIO-GRO! It's absolutely NEW; a liquified organic fish fertilizer with added micronutrients. Nutritionally complete—neutral in pH—absolutely SAFE for all plants. ECONOMICAL, too. One pint makes 40 to 100 gallons of nourishing, pure liquid plant food.

You can get BIO-GRO from most seed stores; or order by mail. Pint cans 85c; quarts $1.35; or half-pint trial size 50c—all postpaid. Write "Bioproducts, Dept. B."

ORDER NOW!

▶ Make this year's garden your finest ...with BIO-GRO!

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ORGANIC SUPPLEMENTS

TO increase the NPK of your garden organically, we offer the following supplements—

For Nitrogen (N)
DISPOSAL ORGANICS—an excellent plant food containing nitrogen fixing organisms.

For Phosphorus (P)
BONE MEAL & RAW PHOSPHATE ROCK—finely pulverized natural rock phosphate.

For Potassium (K)
ORGANIC POTASH—a natural organic derived from growing plants. No acid or acid reactive substances.

These products may be ordered all at once or individually. Each item contains many of the trace elements so essential to your soil. ***Write today for full information!***

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New Life for Gardens

In a few short weeks Q. R. Compost-Maker changes all vegetable waste into rich, sweet-smelling compost with a thriving worm population which ensures soil yielding bigger, better crops and lovelier, finer-scented flowers.

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For economy of time, cost and labour Q. R. is unrivalled and its use may be profitably continued without fear of ultimately impoverishing the soil.

NO TURNING NEEDED WITH Q. R.

The compost made with Q. R. brought most gratifying results in our garden and we are very enthusiastic about it. (Ohio).

Q. R. has given marvellous results with our Gladioli, Delphiniums, Bench Roses, and particularly with strawberries. (Minneapolis).

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Natural Ground Rock
SOIL–BUILDER

● Now you can safely add the 16 important trace elements necessary for balanced soil nutrition. Martin natural soil-builder adds them to your soil quickly and safely. Apply directly to the soil or add to your compost pile.

Write for price and information

BALLY SPECIALTY PRODUCTS, Bally, Pa.

Home Greenhouses

(*Continued from page* 27)

be less than 5 x 10 ft., but it would be better to build them larger, for a large house contains a greater volume of air. An even temperature is more easily maintained and ventilation is more simple to regulate. Even when the greenhouse is first completed, it may appear large and you'll wonder how you are ever going to fill it, but before you know it, all of the benches and shelves will be filled with growing and flowering plants. You'll even have them in the walks and you will scold yourself for not having built it larger in the first place.

Attached vs. Free Standing Greenhouses

When a greenhuose can be joined to the home, it is just like adding another room to the house . . . A delightful sunny room that you can step into any time without going out of doors. It should be located on a southerly side of the home, preferably with a southeast exposure. Some home gardeners arrange the greenhouse so that there is a space for lounging too, where they can sit in quiet relaxation in the sunshine and enjoy their growing plants. Heating is also easier when the greenhouse is attached, for usually, the same heating system that heats the home can be extended for the greenhouse. But this is another subject, however, which will be covered in a later article. If no space is available where a greenhouse can be built onto a home, it is best to put it up where it will be easily accessible, not so much because it will require constant care, but so that you can enjoy your winter garden to the fullest extent. Modern greenhouses are not a chore when equipped with the latest convenience: automatic heat, automatic ventilation, automatic watering and automatic humidity. They will take care of themselves for days at a time—as long as two weeks without attention. But this too, is another subject that will be covered in the next issue.

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100% PURE WORM CASTINGS

Nature's best food for all varieties of indoor & outdoor plants.

Keep indoor plants healthy with NU-ERTH . . clean, odorless, easy to use! No inorganic chemicals. . .just pure worm castings. Promotes more luxuriant foliage and stronger growth.

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Two 1 lb. tins $1 postpd.

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COLLOIDAL
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SOFT PHOSPHATE

NATURALLY FINER THAN ROCK CAN BE GROUND
Containing 14 Trace Elements

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TENNESSEE & FLORIDA ROCK–All Grades

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FOR THE JOY OF ORGANIC GARDENING

Activ0 makes rich, activated compost-fertilizer quicker, better, easier, cheaper from waste.. leaves, garbage, etc.... (reduces garbage without odor!)...Activates, conditions and sweetens soils...Many other uses. Organic. Bacterial. Odorless. Trial size for 425-lb. compost, No. T1-1025, $1.00.

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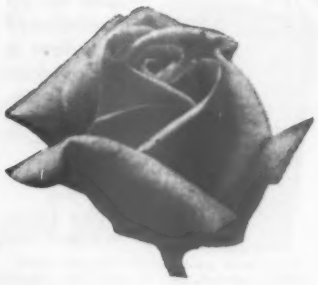
ACT NOW FIRST COME—FIRST SERVED WHILE THEY LAST BEST BUY YET

Special for Compost, Lawn & Garden 50 lbs. EACH Compost Sawdust, Pulverized Limestone, Feldspar, Ridgelizer, Dehydrated Hen Manure, Driconure, Milorganite, Michigan Peat, Cocoa Shells, Espoma, plus 5 lbs. Rubm Phosphate Rock and a No. 5 Size bag of Activo all for $15.00 frt. or express collect from Townsend, Mass. or any four different above items $9.00.

SOILSERVICE Request our price list TOWNSEND, MASS.

Brownell Roses



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Can live several decades even after low subzero. *Save replacement expense.* **Plants that fail, anywhere, within 2 years, replaced free, purchased from the hybridizers—**

Also 20 beautiful yellow and orange hardy Climbers

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If you are interested in J. I. Rodale's articles on cancer, read **"The Healthy Hunzas".** This informative book describes a race of cancer-free people in the northwestern section of India. Your eyes will be opened when you learn the important part farming plays in the health and prosperity of the world. Written by J. I. Rodale, this clothbound book sells for **$3.00** postpaid. ***Send for your copy today.***

ORGANIC GARDENING
Dept. 2-G, Emmaus, Penna.

Root Systems of Vegetables

(Continued from page 32)

plants, that a deeply rooted crop like clover preceding it would be most favorable as a green-manure crop to supply humus. The roots of the clovers extend deeply and have a very beneficial effect upon the soils to a greater depth than most green-manure crops. The effects of roots of legumes upon their death and decay in loosening and aerating the deeper soil are very great. After clover and alfalfa have been grown in it, the soil is quite filled with root channels which greatly modify its structure and promote aeration. The decaying roots add considerable amounts of manure. In the case of a good stand of 2-year-old red clover, for example, 6,580 pounds of vegetable matter—over 3 tons per acre—were left as roots in the soil. Chemical analyses showed that this included 180 pounds of nitrogen, 71 pounds of phosphoric acid, and 77 pounds of potash.

Effect on Soil Structure.—Extensive root systems like those of chard and beet must exert a pronounced effect upon soil structure. It seems that with the usual spacing of these plants, the soil would be thoroughly ramified with roots. Investigations on the influence of plant roots on the structure of the soil show that in loose soils a very small percentage of the soil spaces is filled by the stronger roots so that no essential decrease in the original mellowness from this source occurs. But in compact soils roots may to a certain degree improve the structure and thus increase production. In compact stiff soil without granular structure, the loosening process is aided, to the benefit of plant growth, by the mechanical action of roots and by a strong modification of the moisture conditions. The beneficial combinations of self-loosening and root action explains the frequent permanent improvement of the soil structure under the continued influence of roots, as in grasslands, and also the prevention of the permanent puddling of the soil by rain. It has been found that a marked surface spreading of roots has a beneficial influence upon the penetration and movement of water in the soil. Water movement is much more rapid, although lateral percolation and loss of water through evaporation is retarded. Where the soil is occupied by plants throughout the year, the effects are most marked.

You'll like

THE ORGANIC FARMER

Its wide coverage on all phases of farming makes it an ideal magazine for the owner of any size farm. In the February issue you'll find these articles and many others.

CHAMPIONS GROW CHAMPIONS by Herbert Clarence White is a fascinatingly written story about the success of an organic orchard.

Alden Stahr has written **the success story of a part-time farmer.** If you ever wanted to move to a small place in the country, this article was written for you.

Powdered rock fertilizers are discussed by Dr. W. R. Raymond. *The Organic Farmer* continually publishes articles on how the soil can be improved by the use of economical, finely ground rocks.

One Year, $3 Two Years, $5 Three Years, $6

***Write today!* THE ORGANIC FARMER, Dept. 2-G, Emmaus, Pa.**

B.C.A.

BACTERIAL COMPOST ACTIVATOR FOR FARM COMPOSTING

B.C.A. is a newly developed compost activator that will greatly increase efficiency in your organic farming practices. Here is why:

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B.C.A. is a mixed, concentrated, composite containing a multitude of soil Bacteria developed specifically for the rapid break down of mixed organic wastes in compost heaps. Speeding up the process in making an all organic humus fertilizer.

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B.C.A. has Phosphate Rock incorporated in the culture which contains the 26 necessary minerals. Enough Phosphate Rock is in the Activator so that adding it separately to the heap is not necessary.

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B.C.A. contains the trace elements, lacking in many soils and so necessary for the best results.

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B.C.A. is a neutral Culture prepared with conditioning food for the Bacteria in a rich peat base.

5 lb. size — $2.00 Prepaid

West of Mississippi $2.50

For approximately 2 tons of compost

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Write TODAY for details on how you can increase profits by using B.C.A. to . . .

ORGANIC PRODUCTS

Dept. B 235 Halsey St.

Newark 2, N. J.

Florida's Waters

(*Continued from page* 42)

River, have escaped unscathed. We asked one of the federal government's veteran hyacinth control men if he could explain why. Aa far as he could see, there was only one concrete item responsible. When we asked him what it was, he said:

"Plain damn luck!"

"Just give 'em time," he then added. "They'll get there."

He showed us a series of charts to back up his prediction. Gradually the plant is creeping westward. Already it has nudged into the panhandle as far as Gulf County. Between 400 and 500 acres can already be found in Lake Talquin, and Lake Miccosukee is literally wrapped in allied water weeds of one kind or another.

From all the study and all the research that went into preparing this article there came out one outstanding conclusion:

No lake or stream in the State of Florida is immune from the insatiable appetite of the water hyacinth.

(To be continued)

•

New Organic Method

(*Continued from page* 32)

vegetable garden so that the liquid leachings from below will enrich the place where you are going to grow vegetables. Also use a lot of earthworms in it. Their working will prevent some of the oxidation losses from above, and their manure will make up more than is lost. Keep moving the location of each new heap so that in time the entire garden has been treated in this manner.

Readers please let us have your viewpoint and your experience with the new method.

Build Your Organic Gardening

library with the back copies. All 1948-1949 issues are available except May 1949. 25c per copy.

ORGANIC GARDENING, Emmaus, Pa.

FOR *Best Results*

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BULB of the Month CLUB

125 Madison Dept. 08A Chicago

Miscellany . . .

(*Continued from page* 34)

mental, and get the benefit of one of the finest foods it is possible to eat? Imagine the deep, wine-like fragrance you will breathe in, when the grapes are hanging ripe, everytime you go in or out, or while you rest on your porch. Get busy on this! Many people who write in and ask where they can buy organically produced food, overlook this simple method of getting some. Also don't forget to grow some sunflower plants for an organic item of food for the winter.

CHRISTIAN SCIENCE MONITOR

Here is a beautiful item from the Christian Science Monitor taken from an article describing a leaf-grinding machine made by the Propulsion Engine Corp. of Kansas City:

"Theirs is a familiar theme among agriculturists of the organic gardening school who hold that weedicides, insecticides, etc., do not deal with the real source of the difficulties but frequently further upset the balance of nature. Vegetables and flowers grown in good natural soil are certainly stronger and better able to resist bugs and attacking fungal disorders than are weak plants, poorly established. The pioneers, for example, had such good crops because they were breaking new and virgin soil. And today, everyone can have the experience of finding his own home-grown tomatoes, squash, or corn taste far better than equally fine-looking market produce—and it isn't all imagination."

A LETTER

Here is a letter from Elwyn Jackson of Cortland, N. Y.:

Gentlemen:

To quote from "The World's Strangest Factory" by Don Wharton in The American Mercury, as condensed in the August 1949 Readers' Digest:

"In Ohio experimentors mixed a trace of radiophosphorus in 125 lbs. of fertilizer spread on clover, later detected it in the hay, then in the milk of the cow fed on the hay, finally in the bones of the calf that drank the milk."

People drink milk! Here is proof from the most modern science that chemicals and poisons used in artificial fertilizers and sprays are incorporated in all the food we eat.

PENNA. GOVERNOR ILL WITH DDT POISONING

Newspaper item (Aug. 13, 1949):

Pittsburgh—Governor James H. Duff was confined to his hotel room here yesterday with a painful case of DDT poisoning. The Governor said he picked it up from heavily-sprayed vegetation at his summer home at Indiantown Gap. He expects to be able to return to Harrisburg Sunday.

I had written some time ago to Governor Duff to investigate the claims of the organiculturists, but nothing came of it.

J. I. RODALE

Spring Problems—

(*Continued from page* 43)

There are, of course, gaps in my list—vegetables that I have not mentioned at all—and there will surely be some reader who will marvel that I could have left out such and such a delicacy. The Jerusalem Artichoke has its supporters—I am one of them—and Celeriac, Celtuce, Chinese Cabbage and Collards have their enthusiasts. Swiss Chard, of course, is grown in most gardens, but varieties are few and the same is true of Kohlrabi and Leeks—two excellent vegetables which ought to find a place in any garden of fair size. Many gardeners will want a few Eggplants and peppers, but most of them will buy seedlings rather than seeds. Everyone grows Radishes, but they are choosen largely on the basis of color and shape. Of Salisfy, only one or two varieties are offered, and as for Parsnips I think Mother Nature invented them on one of her off-days. If you like them, please choose your own variety; I could not take the responsibility of recommending any.

Garden Calendar

(*Continued from page* 45)

cuttings of many of the deciduous shrubs and trees may be put out in nursery rows. Figs, grapes, pomegranates and quince may be propagated in the same way. Prune and shape up deciduous fruit trees and grapes before the new growth starts. Protect the trunk of all trees from sunburn. Winter sunburn is often much worse than summer. Use tree whitewash or the adjustable yucca protectors if available. They are very easily adjusted. Budding and grafting may be done at this time.

Vegetables: By the middle of February the time has arrived for planting the early spring garden. Plant the first crop of Irish potatoes. Set out plants of cabbage, broccoli, kale, chard, leaf lettuce and seedling onions and sets. Sow seeds of beets, carrots, mustard, kohlrabi, turnips, Swiss Chard and radishes. The last week in February, plant Canadian Wonder Bush beans. The spring crops can be planted immediately. Set dormant roots of artichokes, asparagus, horse-radish and rhubarb. Sow in heated coldframes, tomatoes, eggplant and peppers. Start at the same time yams and sweet potatoes so as to take off and establish the cuttings if you want a good crop. Commercial growers use hot caps and other devices for forcing their crops on early, but there is no particular object in the average home gardener forcing the season.

—o—

Report on Potatoes

(*Continued from page* 35)

their resistance to bugs. Even in spite of the drought, there was no scab or any kind of disease on the potatoes.

Most of the New Jersey potato crop withered up and died in the drought but these potatoes were perfect. Our yield was not as large as it would have been with normal or any rainfall, but each plant had from twenty-four to thrity-six potatoes on it and we harvested two hundred pounds from two, fifty-foot rows. A neighbor, under the same weather conditions, planted two hundred pounds of seed potatoes and harvested fifty pounds.

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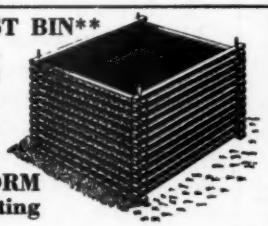

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Readers' Correspondence

Scale on Apple Trees

Q. My mother has found a scale on her apple trees at Southampton, Long Island, and wants to know how she can eliminate them without using a poisonous spray.

D. M. McK., Ridgefield, Conn.

A. The apple tree scale is a sucking insect which attaches itself to the bark and sucks vital juices from the tree. Scale insects can best be eliminated by spraying the tree, while in the dormant (winter) condition with a 3 per cent oil spray. The oil forms a film over the insects and kills them by excluding oxygen from the air. The oil is not poisonous and will not injure the tree or soil organisms if it drips to the ground and enters the soil.

—o—

Protect Bulbs from Mice

Q. What can I do or use to prevent moles and mice from eating or chewing at my jonquil and hyacinth bulbs?

J. V., Ft. Crook, Nebr.

A. Moles do not eat bulbs or any other kind of plants. They burrow in the ground in search of insects, insect larvae, earthworms, and other food animals. They often make burrows under rows of plants or in bulb beds because there is where the insects happen to be. The mole burrows unfortunately open the way for the mice which do eat various kinds of bulbs. The moles can be eradicated by using a choker-type (Nash) trap bated with meat. Without the burrows of moles, the mice are not apt to damage the bulbs in the ground.

—o—

Lilacs Need Lime

Q. Of my three lilacs only one bloomed last year and none bloomed

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this year. The plants do not seem to grow. Can you tell me what the trouble is with my four-year-old plants?

W. B., Paterson, N. J.

A. Lilacs are good natured and tolerant of almost any soil and situation, but thrive best in rich, well-drained soil in an open situation. They appreciate lime, and respond well to bonemeal and compost made with lime and phosphate rock. Allow only four or five of the strongest stems to remain on each plant. If the plants have oyster-shell scale, paint the plant while in the dormant condition with a 3 per cent oil o. spray this oil on the plants.

—o—

How Grow Sweet Peas

Q. I just can't grow sweet peas as the stems and leaves turn yellow and die. The Seed Company specializing in sweet peas to which I sent a sample of my soil claim the soil is diseased. What does one do for diseased soil?

Miss C. E., Menomonie, Wisc.

A. Sweet peas will not grow in an acid soil which is deficient in humus and the trace elements which they require. You can grow sweet peas successfully in your soil if you will add a good grade compost made with lime and pulverized phosphate rock and enough shredded seaweed to supply the trace elements.

—o—

Honey and Artificial Heat

Q. It is a common practice in this area to heat honey to 150 degrees F. to prevent it from sugaring. Does this heating destroy any of the beneficial qualities of the honey?

T. L. McC.,
West Redding, Conn.

A. Any vitamins and hormones which may be present in the honey will almost certainly be destroyed by a temperature of 150 degrees F. It is possible that the heating may also change the molecular structure of the honey, and thus reduce its value as food.

—o—

Cotton Easter Scale

Q. I have a grapefruit tree which has had cotton easter scale for six years, and I have used every kind of spray known in my efforts to stop it. The Department of Agriculture tells me that this is caused by the ants sponsoring the pests, and that ant control is my first problem. Similar insect pests are attacking my grapes, and apples. How can I control the ants?

K. E. G., Laton, Calif.

A. Ants are for the most part crawling insects and can only carry aphids and other insects up the trunk or stem of a plant. The simplest method of preventing ants from carrying aphids on your trees and vines is to band the stem of the plant with a sticky material through which the ants cannot pass. Once you have banded your trees so that ants cannot climb them, you can rid your trees and vines of the aphids which are on them. If you have only a few trees you can clean them with a hand brush using first a 3 per cent oil and then a paste made up of equal parts of clay and fresh cow manure in water.

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MILLET as a Human Food

(*Continued from page* 25)

cumbed to acid intoxication and vitamin deficiency. But when they were put on a millet diet, they remained in perfect health. They concluded that *millet is the only grain that is able to support animal life and development for a considerable length of time when used as an exclusive food.* It is well known that chickens and birds will thrive when fed only millet but will get sick and die if fed on wheat. In such case they would need the addition of green leafy material to their diet to supply sufficient alkaline minerals and vitamins to neutralize the acids produced by a wheat diet and to prevent the development of deficiency diseases. But when millet is fed, this is not necessary, as millet seems to contain within itself a nutritional balance of minerals and vitamins, which enables it to maintain the acid-base balance at a proper level, as well as to supply all essential vitamins which other grains when fed exclusively, as Osborne and Mendel have demonstrated, are unable to do.

I shall terminate this article by relating the following interesting incident related by a friend who has become quite interested in millet, and has established a business of selling millet as a human food. One day he threw a handful of assorted grains to his chickens, including rye, wheat, oats and millet. He was interested to observe that the chickens pecked at the millet grains to the exclusion of all others, and only after they had eaten the last grain of millet did they condescend to peck at the other cereals. Could it be that these chickens were wiser regarding the nutritional and vitamin value of millet than our learned scientists who still maintain the old belief that "wheat is the staff of life"? I shall leave it to those readers who have carefully read this article to answer this question for themselves.

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SAY YOU SAW IT
IN THE PAGES OF
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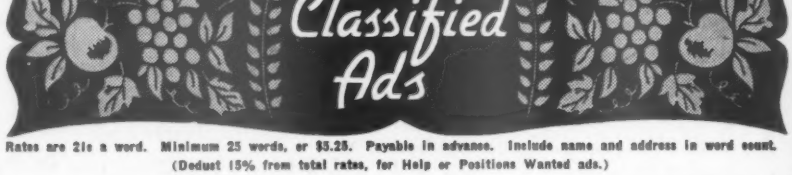
I Don't Believe

(*Continued from page 25*)

was a flat, smooth surface, surrounded by handsome green leaves.

Needless to say, I should like to think that my success is due to my exceptional skill—to the masterly way I sow the seeds, to the delicate touch with which I handle the watering can, and to the exquisite workmanship I display when I transplant the seedlings. Unfortunately, I can think nothing of the kind. What I do, any gardener can do. The only conclusion I can come to is that these experts make things difficult for themselves and their pupils and above all for the cauliflowers by "enriching" the soil with a "complete" fertilizer prior to sowing and making success practically impossible by giving a "side-dressing" to the crop when it is half-grown. All I do is to rake some sifted compost into the drill when I sow the seeds and dig a spadeful of compost into the soil at the place to which I am going to transplant the well-developed seedling. I find that very easy, and the plant seems to like it, too.



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